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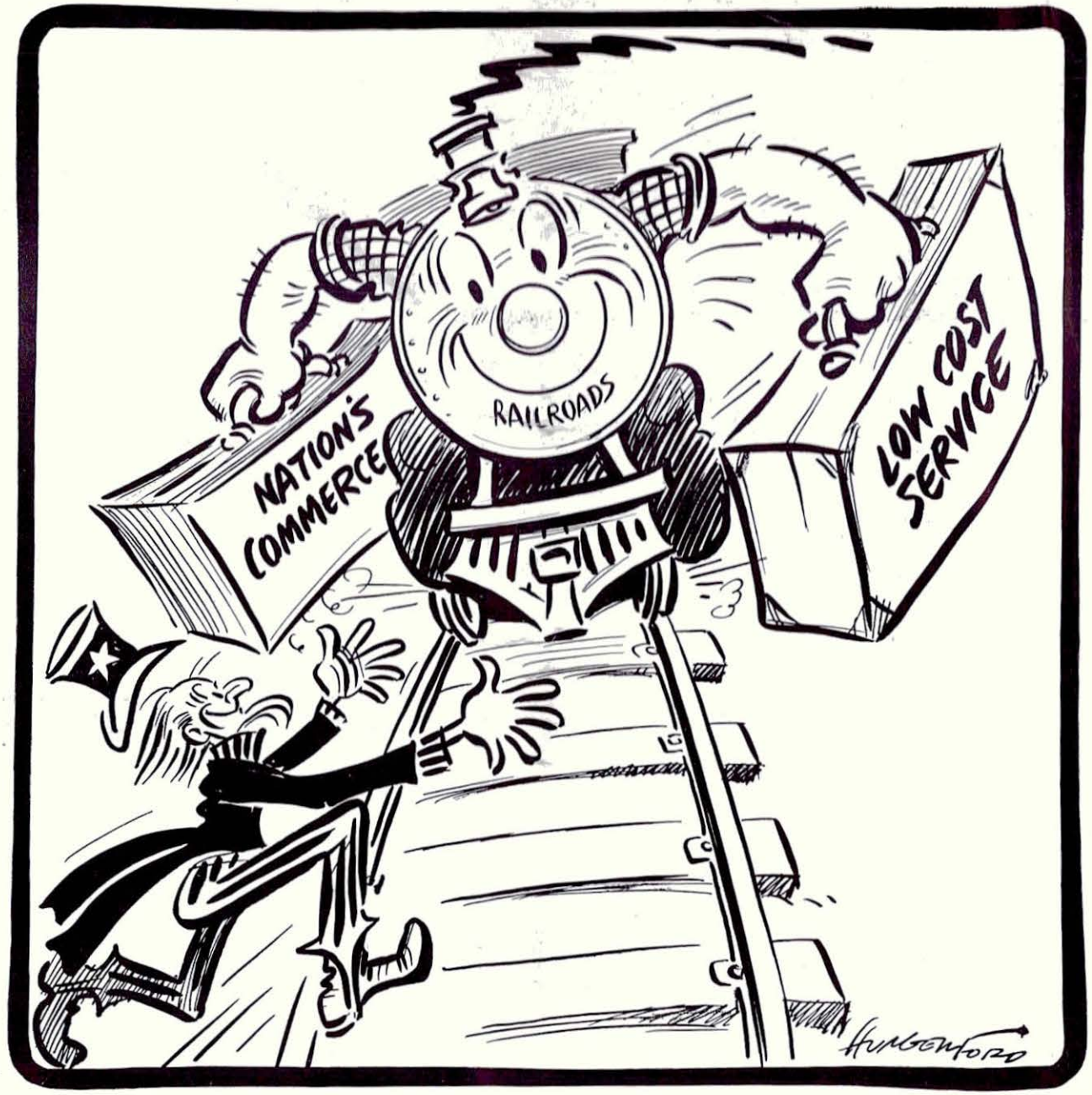

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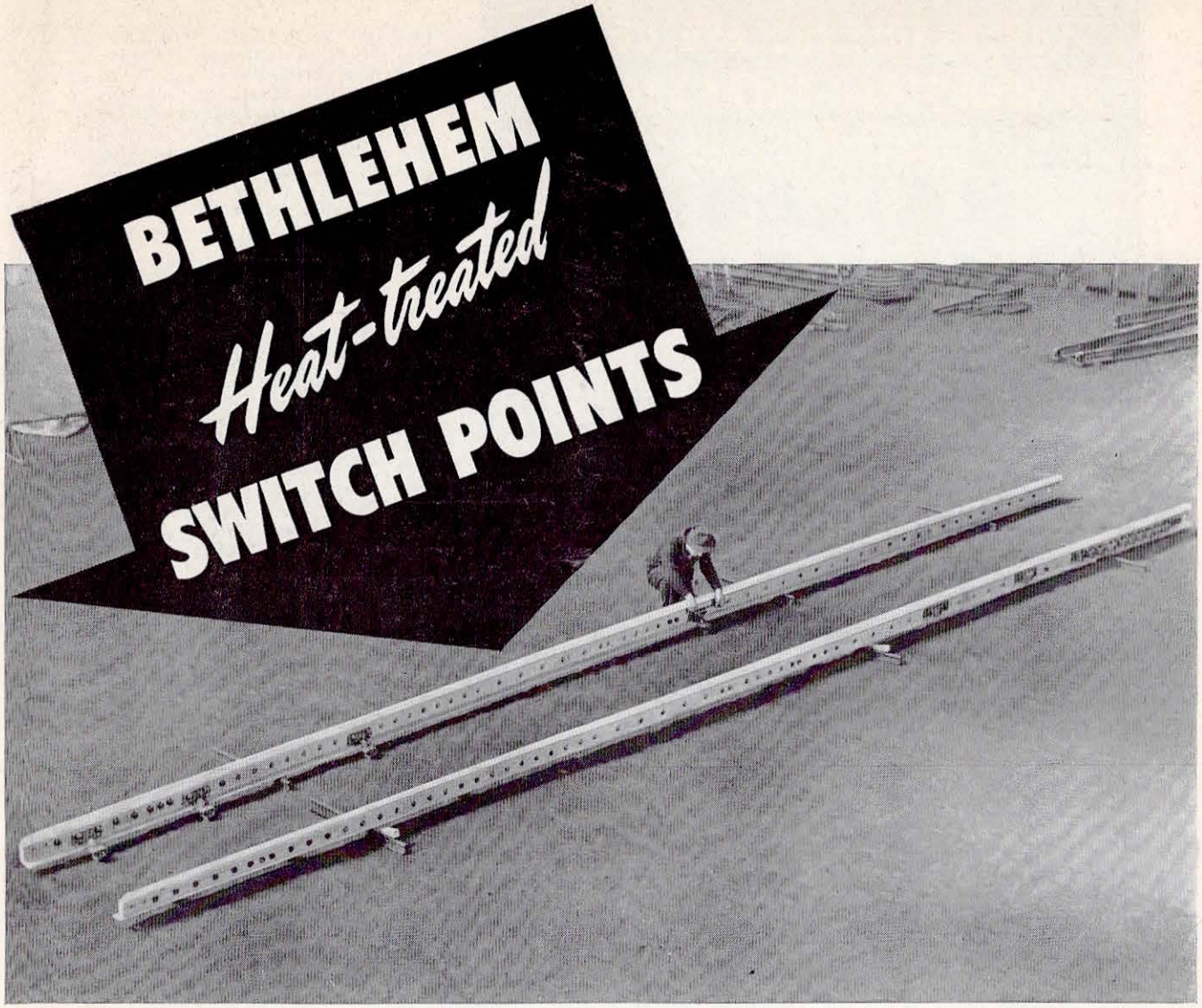

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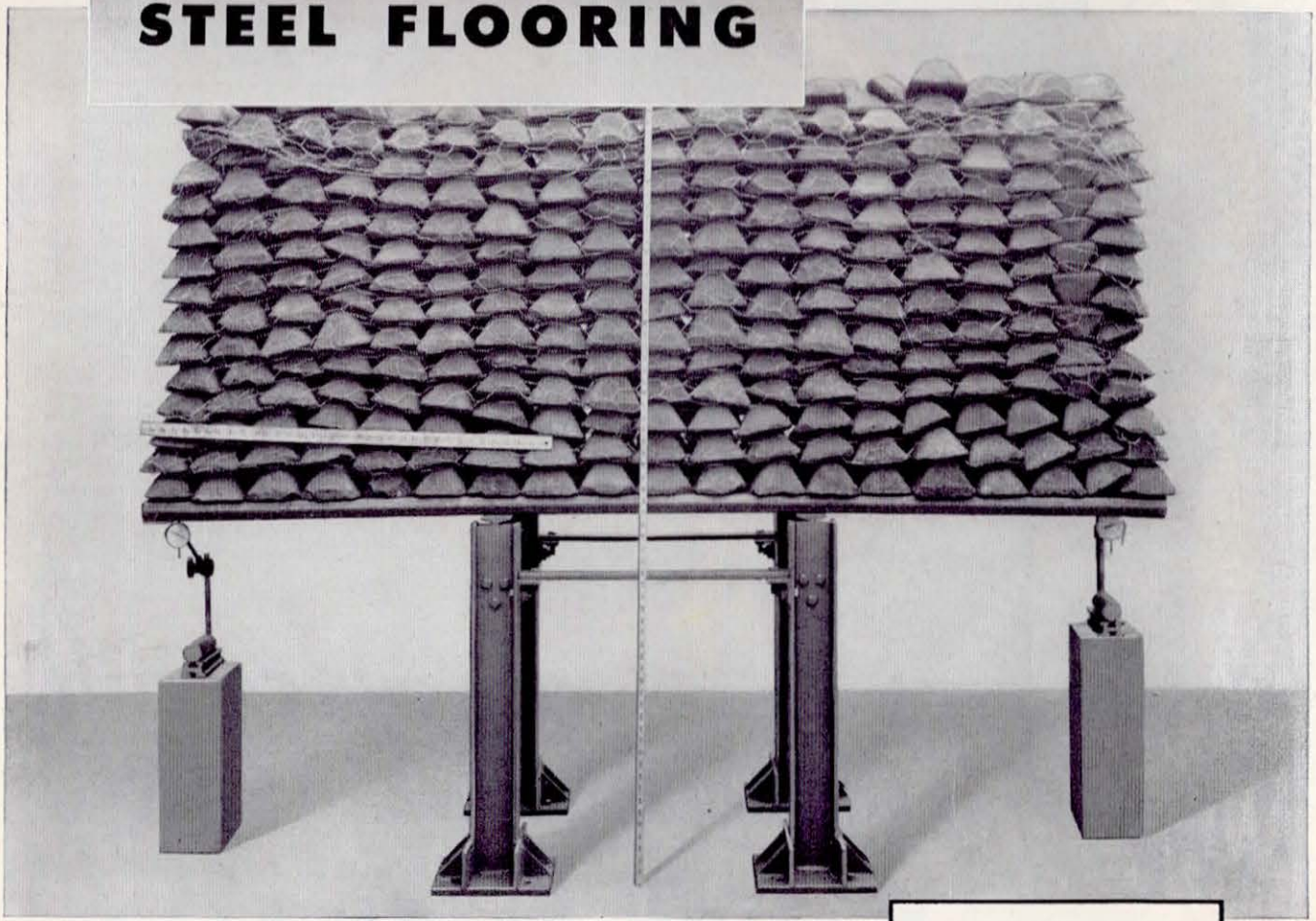

In actual use as well as in laboratory tests it has been proved that NAILABLE STEEL FLOORING can't break through under *any* kind of heavy freight. Boxcars with NAILABLE STEEL FLOORING have safely hauled heavy copper cakes, automobile engines, highly concentrated loads of sheet steel and tinplate as well as hundreds of other commodities.

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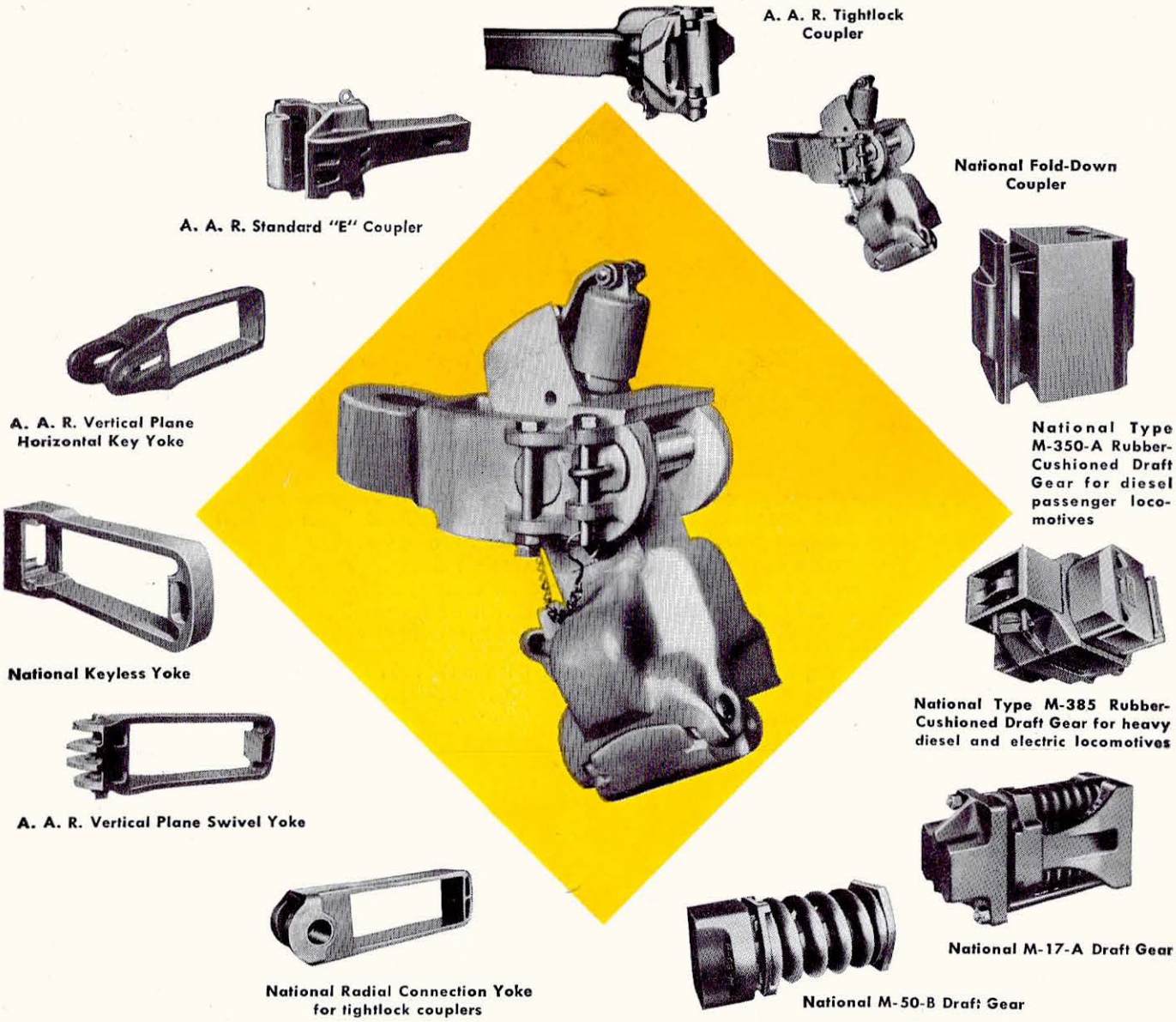
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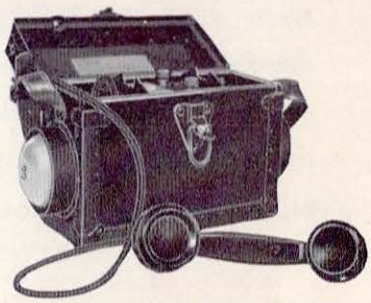

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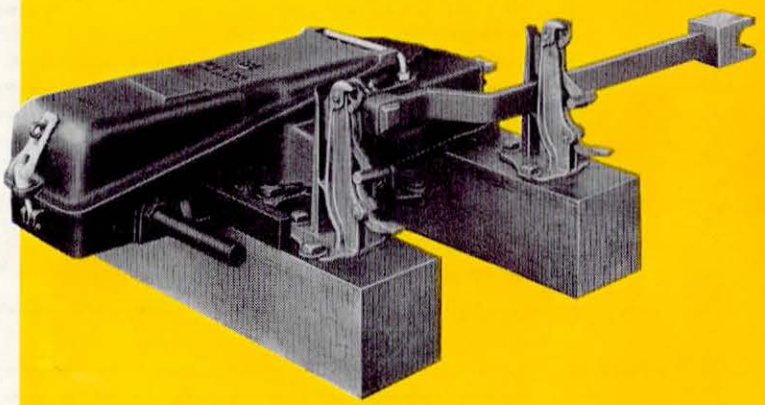

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WEEK AT A GLANCE

COMING NEXT WEEK: The 1949 Statistical Issue of *Railway Age*.

WAYS TO LOWER COSTS: Cutting costs by modern methods of handling materials will be the theme of a series of technical discussions sponsored by the Materials Handling division of the American Society of Mechanical Engineers in conjunction with the Third Annual Materials Handling Exposition, to be held at Philadelphia, Pa., January 10-14. The program for these sessions is summarized in our News pages.

LIQUIDATION: Our leading editorial points out that the American "middle class," inert, leaderless and unorganized, is in grave danger of economic "liquidation" as a result of the socialistic policies being followed by politicians and labor leaders.

UPS AND DOWNS: Railroad statistics, carefully and comprehensively studied, yield some significant indications of the effect on railroad performance of the cyclical ups and downs of general business. Such a study has recently been made by Thor Hultgren, of the research staff of the National Bureau of Economic Research. His complete report is being published in book form, but an article starting on page 26 summarizes and previews his findings.

OUT FOR BUSINESS: A traffic development campaign by a short line may not be a case of "man bites dog," but it still rates as news. An article on page 19 tells what the Chesapeake Western is doing to increase its own traffic by promoting the industrial development of the territory it serves.

M. U.'s: In an article which begins on page 23, E. G. Frank of the General Electric Company describes new motor-trailer car combinations designed for multiple-unit operation in the Reading's electric suburban service at Philadelphia, Pa. The motor cars were built, and the trailers converted, by the American Car & Foundry Co.

FERTILIZER FOR THE WORLD: An illustrated article beginning on page 38 describes the special organization and operating procedure which the Atlantic Coast Line has set up to protect and transport maximum production of Florida phosphate rock.

WHAT TYPE OF MOTIVE POWER?: One of our feature articles this week is an analysis of the present positions and potentialities of all types of locomotives now in service or in prospect for the future—a matter of interest and concern to executives as well as to motive power specialists. The author is H. E. Dralle, of the Westinghouse Electric Corporation, who presents some significant comparisons of reciprocating steam, geared steam turbine, electric, Diesel electric, steam turbine electric, and gas turbine electric locomotives.

NEW COMMISSARY: To provide modern and efficient equipment for receipt, storage, processing and dispensing of dining car supplies is the purpose of a new commissary building recently opened at Chicago by the Pennsylvania. The building and its operation are illustrated and described in an article which begins on page 34.

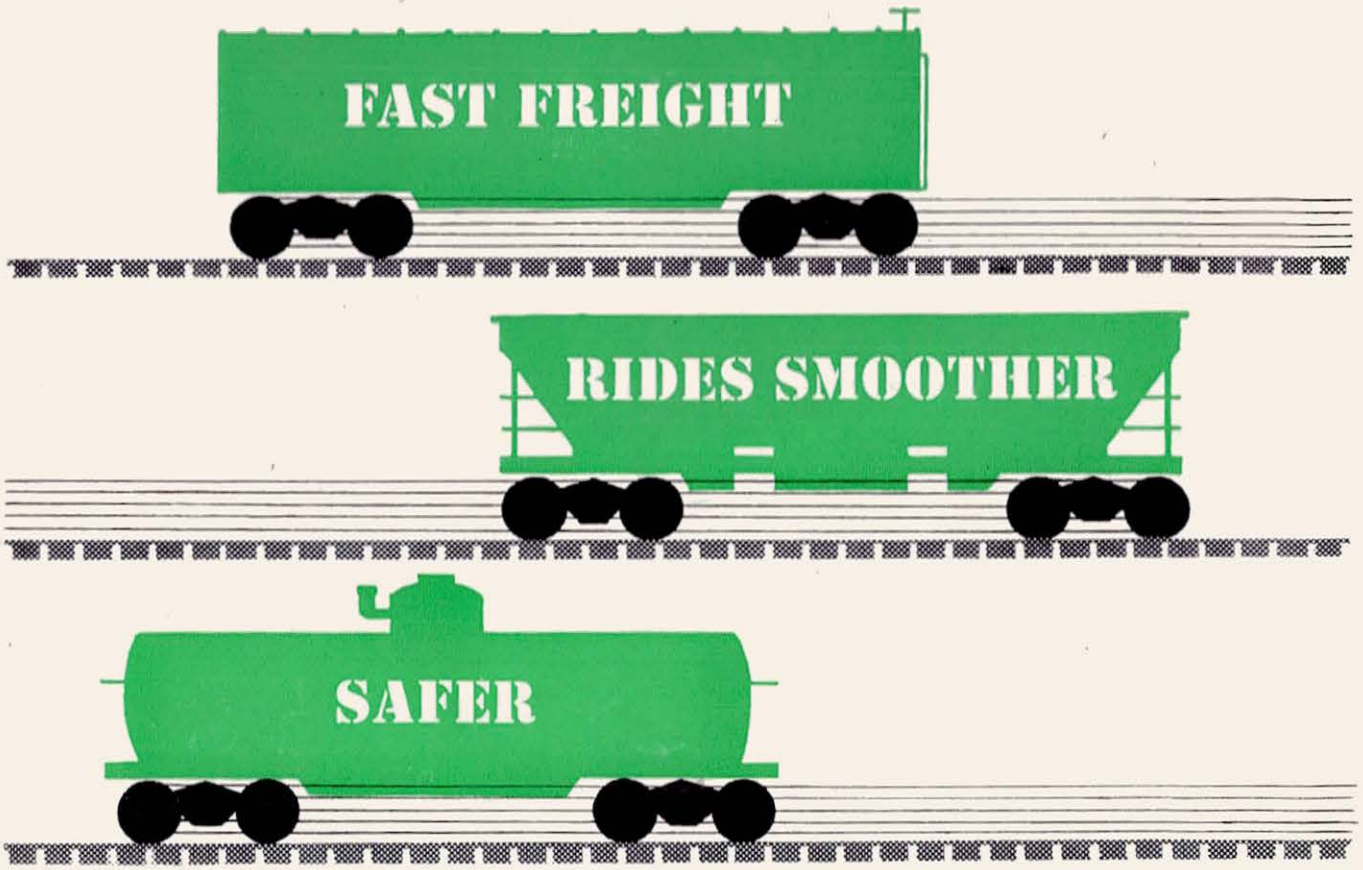
BUILDING SALESMANSHIP: The railroads are sometimes charged with being deficient in those qualities of salesmanship which are such a distinguishing feature of so many American industries. The charge, like others levelled at the railroads, probably isn't wholly true, but at least one road—the Baltimore & Ohio—thinks there may still be room for improvement in its passenger traffic sales tactics. The methods used to bring about the desired improvement are described on page 41, in an article by John F. Whittington, the B.&O.'s general passenger traffic manager.

HEY, FOR THE MERRY GREEN WOOD!: Operation of a railroad is a job with many ramifications, but running a forest isn't ordinarly considered one of them. The Southern, however, thinks differently, and has definitely profited from acting on its convictions, as is shown by the article on pages 32 and 33, about that road's Lincoln Green Demonstration Forest at Dorchester, S. C. Incidentally, our News pages also report the award to the Southern by the state of South Carolina of a "certificate of merit" for its operation of this forest.

CAR SUPPLY IMPROVES: The monthly review of the transportation situation by Arthur H. Gass, chairman of the Car Service Division of the Association of American Railroads, summarized in our News section, shows considerable improvement in box car supply and "slight easing" of the gondola situation.

FASTER, CHEAPER UNLOADING: An illustrated article which starts on page 20 tells how the Great Northern has saved time and labor and cut costs by installing a new mechanical car dumper, capable of handling seven or eight cars per hour, at its big grain elevators at Superior, Wis. The article describes in detail the operation of the dumper and the elevator layout.

regular road service is delivering
more evidence every day.....



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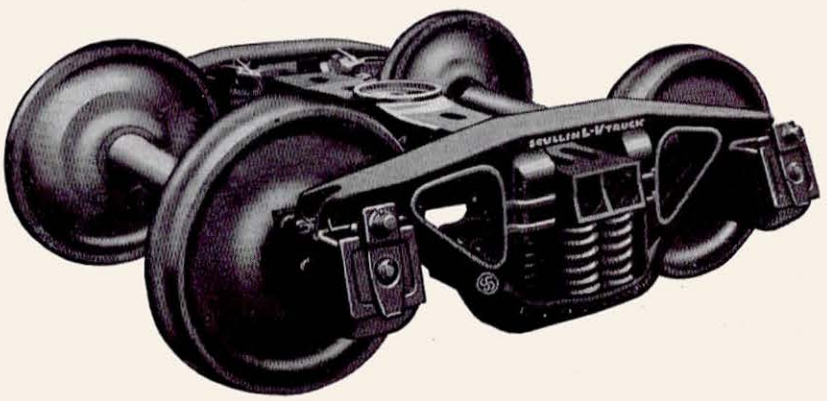

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LIQUIDATING THE MIDDLE CLASS

The most important thing which is occurring in this country is use of the power of government to expropriate and liquidate the middle class. The paradox of it is that most members of the middle class are doing nothing to stop their own expropriation and liquidation, but are aiding in it.

The middle class consists roughly of that large number of persons who have brains enough to make their incomes without manual labor and who, having incomes per family ranging from, say, $5,000 to $50,000 a year (before taxes), are neither poor nor rich. They desire to do better work than others and to be paid better for it and rely for increases in their incomes on their individual ability, efforts and thrift, and not on the pressure of labor unions for equal pay for unequal ability and effort.

Mental, Moral, Economic Backbone

The middle class always has been and still is the mental, moral and economic backbone of the United States. The attacks to which it is being subjected are being directed by politicians and labor leaders, ostensibly against business, especially "big business," and particularly against business profits, which it is charged are excessive. But business is not something separate and distinct from its owners; and when business is attacked it actually is the owners of business who are attacked. Who, then, are its owners? The rich own only a small part of it, manual workers hardly any of it. The great bulk of business — i.e., the great bulk of all the means devoted to production, distribution and exchange — is directly and indirectly owned by the middle class. Hence when attacks are made on business and business profits they are made principally on the middle class.

Three of the principal ways in which the middle class is now being attacked are by (1) efforts of labor union monopolies, backed by politicians, to take increases in wages out of profits, (2) policies of taxation of business and individual incomes which would unduly restrict profits and take excessive parts of larger than average incomes, and (3) control of rentals which deprive the owners of residential property—most of them middle class—of the return on their investment which they would receive under a free economy, thereby forcing them to subsidize their tenants.

These are but a few of many socialistic policies already adopted or proposed having the purpose of dragging down the middle class — called in Europe the "bourgeois" — for the especial benefit of the "proletariat." The long range benefit to the

proletariat is extremely doubtful. The immediate and long range injury to the middle class is unquestionable. It may be stated almost without reservation that *every* socialistic policy is injurious to the middle class. Significantly, the avowed purpose of socialism and communism in every country in Europe is "liquidation" of the "bourgeois" by and for the supposed benefit of the "proletariat." "Liquidation," as the word is used over there, may mean any form of destruction of the "bourgeois" from confiscation of its property to standing it against a wall and shooting it.

The writer of this editorial long disbelieved that socialism could be peacefully established in any country with a large middle class, because he believed the middle class would resort to force, if necessary, to prevent the wholesale confiscation of its property involved in the establishment of socialism or communism. This did occur in Italy and Germany where the initial driving force of Fascism and Nazism was furnished by the resistance of the middle class to its liquidation by the policies of communistic and socialistic labor unions and governments.

But in Great Britain many middle class voters helped put the present Labor government, with its socialistic policies, in power. And in the United States the middle class has as yet shown no disposition to present a united front under strong leadership in opposition to the socialistic policies of the labor leaders and the New Deal politicians who are allied with them. Virtually all the millions who voted for Dewey were members of the middle class who were opposed to socialistic policies; but Dewey was so sure of the middle class vote that he kept a large part of it away from the polls by making no appeal to it and addressing his entire appeal to the proletariat — i.e., to those who have so little brains that they can do only manual work and want the power of government used to help them live largely on the work and thrift of those having better brains.

Everything But Chains

The principal reason why labor leaders and politicians who take orders from them are becoming so successful in securing adoption of policies tending to liquidate the middle class is that our laws tolerate and encourage the organization of manual workers into powerful labor union monopolies; and that while labor unions formerly sought only such economic objectives as higher wages and easier working conditions for their members, these powerful labor monopolies are now being used in politics by skillful leadership to control government and use government for purposes that are supposed to be in the interest of the proletariat, but that are plainly inimical to the middle class. It is very significant that after the recent election, the chairman of the Democratic national committee said "Labor" — i.e., organized labor — "did it."

Before the New Deal anybody would have been considered insane who had predicted that the American middle class, with its control of the brains and property of the country, would soon find that it had lost almost all influence in the federal government and was in process of rapid liquidation because of socialistic policies adopted by that government under the control of labor union leaders and their political henchmen. But that is what has occurred and is occurring. It has occurred and is still occurring because the middle class has been either oblivious to what has been and still is occurring, or too inert and leaderless to organize to defend itself.

About a century ago Marx and Engels concluded the Communist Manifesto with the words: "Workers of the world, arise! You have nothing to lose but your chains." This might now be appropriately paraphrased to read: "Middle class of America, arise! You will soon have lost everything but your chains!"

THE MOST POTENT WEAPON AGAINST CROSSING ACCIDENTS

Accidents continued to occur at railroad-highway intersections during 1948 in spite of increased effort by both public agencies and the railroads to prevent them. Without this effort, however, casualties would unquestionably have been worse—so the battle of elimination, protection and education in safe practices must go on. Even if preventive measures should only stay the rise in accidents which could be expected as "exposure" continues to increase with heavier highway traffic, they would still be worth their cost.

During the past year, according to information made available to *Railway Age* by practically all of the country's railroads, work on the elimination of about 240 grade crossings and on the reconstruction of 60 existing grade separation structures was in progress, involving a total expenditure of at least $100,000,000. At the same time, protection was afforded at 1,432 crossings, involving the installation of 3,641 flashing-light signals, gates, and similar protective devices. In both classes of work activity was greater than for a number of years.

Allocating the costs among the parties at interest in ratio to the benefits each derives—the formula now being widely accepted by federal, state and local authorities—the expense of grade separation is being defrayed largely from public funds, although in many cases the railroads are called upon to make substantial contributions—up to 50 per

cent of the cost, or even more in some cases. In deference to the same principle, public agencies are showing increasing willingness to share the costs of crossing protection—although, of the 1,432 installations made in 1948, the railroads paid in full for 800 and shared in the cost of 325; while only 307 were paid for entirely by tax funds.

Accident statistics of the Interstate Commerce Commission for the first ten months of 1948 show that 1,273 persons were killed and 3,271 were injured at railroad-highway grade crossings within this period, compared with 1,430 killed and 3,206 injured during the comparable period of 1947. In October last, alone, 173 persons were killed and 412 were injured at crossings, compared with 147 killed and 318 injured in the same month of 1947.

To the extent that the 10-months' fatalities in 1948 show improvement over 1947 there is cause for some degree of satisfaction, but the figures for total casualties afford no room for complacency. As public agencies responsible for highway traffic accept more generally their rightful share of responsibility for reducing the hazards at grade crossings, the record of crossing accidents can be expected to improve. But in view of the large number of crossings and stupendous costs involved, nothing for years to come can do so much to reduce crossing accidents and casualties as intensified campaigns to educate the public in safe crossing practices. In these campaigns, the railways, jointly and severally, can be expected to make a substantial contribution. A striking example of this is evidenced in a new grade-crossing sound-color safety film, entitled "Look, Listen and Live," just released by the Union Pacific, together with 500,000 copies of a two-color, 12-page booklet of the same title.

POOR FACILITIES ADD TO THE BURDEN OF COST

The railroads are approaching a time when they are going to find it necessary to review their motive power policies in order to adjust themselves to the changes of the next five to ten years, and assure themselves that the total expense for the "power to haul trains" will not be out of line with the conditions then existing. Recent statistics lead inevitably to the conclusion that a more realistic attitude toward the matter of facilities for repairing and servicing steam locomotives must soon be adopted, if costs of steam-locomotive repairs are not to increase out of all proportion. Roads which have reduced inventories of steam power may soon find themselves facing substantial increases in the unit cost of servicing steam locomotives if they continue in service many millions of dollars worth of obsolete shop and engine terminal facilities for which they no longer have use. Already, where the older shop and engine terminal facilities are used jointly by both steam and Diesel power, the Diesel is in many cases bearing the burden of unjustified charges.

Under present conditions it seems impossible to control the *cost* of a man-hour of labor—so the alternative is to control the *use* of man-hours. Obsolete facilities which require a maximum of manual-labor-hours as compared with mechanized-labor-hours are extravagant in the expenditure of man-hours and the expense accounts in many cases are beginning to show it.

It is no longer a case simply of authorizing expenditures of limited amounts for the replacement of small units of shop equipment, for in many instances a broad policy should be adopted that might lead to the abandonment of existing shops and terminals and their replacement with modern facilities on a more limited scale. There are too many factors involved in this problem—which is an economic as well as an engineering problem—to be considered by any other method than a comprehensive study in order to find out what the facts are so that a policy consistent with actual conditions may be established.

Approximately 84 per cent of the locomotive inventory is still made up of reciprocating steam units and, of the remainder, about 13 per cent is Diesel-electric and two per cent, electric. In the field of its greatest competition—switching—steam power still does more than half the work and all the indications point to the probability that, even at the present rate of replacement of steam by Diesel, we are going to have steam power for years to come. So, what about facilities for its servicing and maintenance? Are the railroads going to "ride through with what they've got" in the matter of back shops and engine terminals, or are they going to do something about getting rid of obsolete facilities that are kept in service though a laborer or mechanic using them takes four or five hours to do a job that should be done in one hour?

The cost of steam locomotive repairs, in 1947, was $527 million. This was the bill paid by the railroads for maintaining 35,000 locomotive units. In 1929, the railroads spent only $409 million to maintain 57,000 steam locomotive units. It is true that the 1947 units were larger and made more mileage per unit. Labor and material costs have increased tremendously and the average age of the locomotives has increased. But on top of these facts it cannot be denied that the facilities for maintaining steam power certainly have *not* been kept up-to-date. A half-billion dollars is a lot of money, and a 5 or 10 per cent reduction in such a repair bill would pay interest charges on a lot of capital.

WHAT TYPE MOTIVE POWER?

By H. E. DRALLE

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Economics dictate a gradual decline in use of the reciprocating steam locomotive, despite the fact that it provides the most horsepower per dollar of initial investment. Competitive forms of motive power are challenging the supremacy of the reciprocating steam locomotive, but the day is still distant when it will cease to be a major factor in rail traffic. Whether or not it will ever completely disappear is debatable.

Other Coal-Burning Locomotives

To satisfy a continuing high level of interest in coal-burning locomotives, efforts are under way to develop new forms of steam motive power. Two of these, the geared steam turbine and the steam-turbine-electric, are already in existence, and others are in prospect.

The geared steam-turbine locomotive, which eliminates many of the disadvantages of the reciprocating type while retaining its desirable features, was first introduced in 1944. It was designed for high-speed passenger or freight service. A geared drive allows small driving wheels, provides greater space for the boiler, offers flexibility in the selection of the wheel arrangements, operates with reduced steam consumption and higher efficiency, and, as it utilizes rotating rather than reciprocating parts, assures a minimum of mechanical trouble and low maintenance.

The geared-turbine locomotive, which is classified as the S-2, has a conventional boiler that supplies power to the 6,900-hp. "forward" and a smaller "reverse" steam turbine geared direct to the driving axles.

The S-2 is a milestone in locomotive design. It adequately demonstrates that the steam turbine is a practical and desirable form of prime mover for locomotives, thus making possible a new, more flexible form of steam locomotive—the steam-turbine-electric.

The steam-turbine-electric locomotive, of which three are in high-speed passenger service on the Chesapeake & Ohio between Washington and Cincinnati, employs a conventional coal-fired steam boiler, a steam turbine, and an electric transmission. All have accumulated extensive operating experience.

Each locomotive, with tender, weighs slightly less than 600 tons when carrying 30 tons of coal and 100 tons of water, and is 153 ft. long and 15½ ft. high. Full horsepower over a wide speed range, small driving wheels that permit flexibility of arrangement and construction to give space and weight efficiency, and the ability to use coal as a fuel, are some of its many advantages.

At full load the single 6,000-hp., 6,000-r.p.m. turbine of the power-generating unit uses 85,000 lb. of steam per hour at 290 lb. inlet pressure, 750 deg. F., exhausting to air. The turbine is geared to two 2-unit, 580-volt, d.c. generators supplying power to eight 620-hp. traction motors on separate driving axles.

The overall efficiency of the steam-turbine-electric is not much greater than that of the reciprocating steam locomotive due, mainly, to losses in the several power transmission steps between boiler and wheels. However, thermal efficiency is only one of the factors entering into the appraisal of the real worth of a locomotive. Others include initial cost, direct operating expense, maintenance cost, developed power per ton, speed-tractive force relationship, fuel cost, flexibility in handling traffic, and availability.

Operating efficiency must be almost doubled to make the steam-turbine-electric strictly competitive with other locomotive types. The answer seems to lie in having a more efficient boiler. Theoretically this can be accomplished in a design employing much higher temperatures and pressures (in the neighborhood of 900 deg. F., 600 lb. pressure) and larger grate area resulting in a 30- to 50-per cent fuel saving per horsepower. Development of such a unit is now under way and indications are that it can be made practical.

Steam at these pressures and temperatures is not practical with reciprocating locomotives, principally because of lubrication and packing problems. It can, however, be utilized advantageously by a turbine.

Electric Locomotives

The electric locomotive was the first to offer real competition to the reciprocating steam type over 40 years ago. The operating performance of the electric locomotive leaves little to be desired, particularly on roads of heavy traffic density. It is unmatched in several respects.

1. High intermittent overload capacity (making possible high schedule speeds in heavy traffic density).
2. Elimination of shock and vibration incident to reciprocating motions (thus lowering track, roadbed, and motive-power maintenance).
3. Cleanliness and quietness of operation.
4. Minimum direct operating expenses.

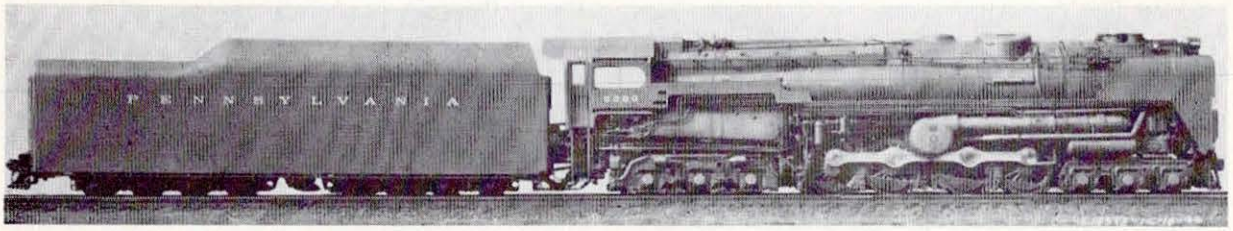
Two systems of electrification are in common use—the a.c. system, usually with a 12,000-volt trolley, and the d.c., with trolley potentials between 600 and 3,000 volts. The relative merits of these two systems have been the subject of much discussion, but neither has such outstanding advantages over the other that it can be unqualifiedly recommended for all electrifications. The choice between the two is largely controlled by local conditions and personal preferences.

The a.c. system has the great advantage of a high-voltage trolley, which makes it economical to supply large blocks of power over long distances for heavy concentrations of traffic.

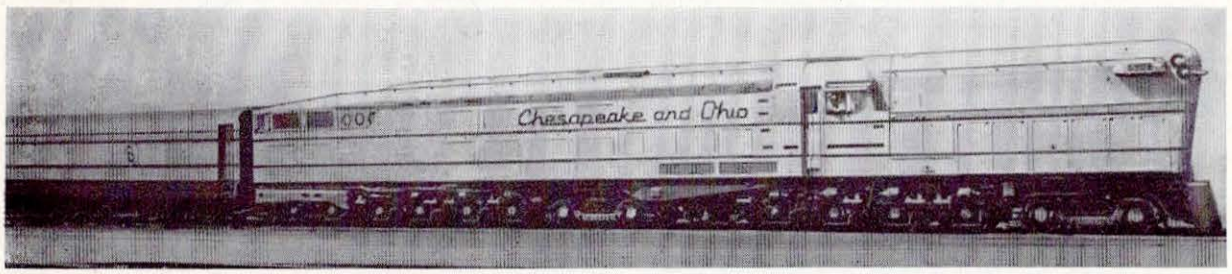
For a.c. systems three types of locomotives have been built, the series-motor type, the motor-generator type, and the split-phase type. The a.c. series-motor loco-

The present positions and the potentialities of all types of locomotives now in service and in prospect

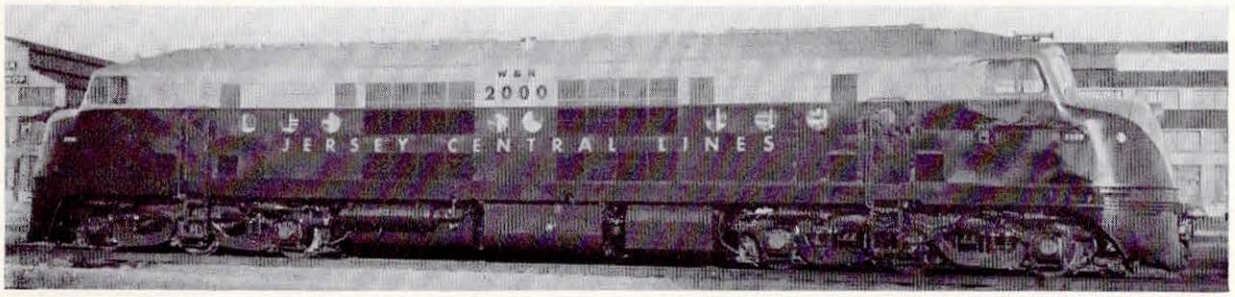
Reciprocating steam locomotives still predominate on American railroads in all types of service



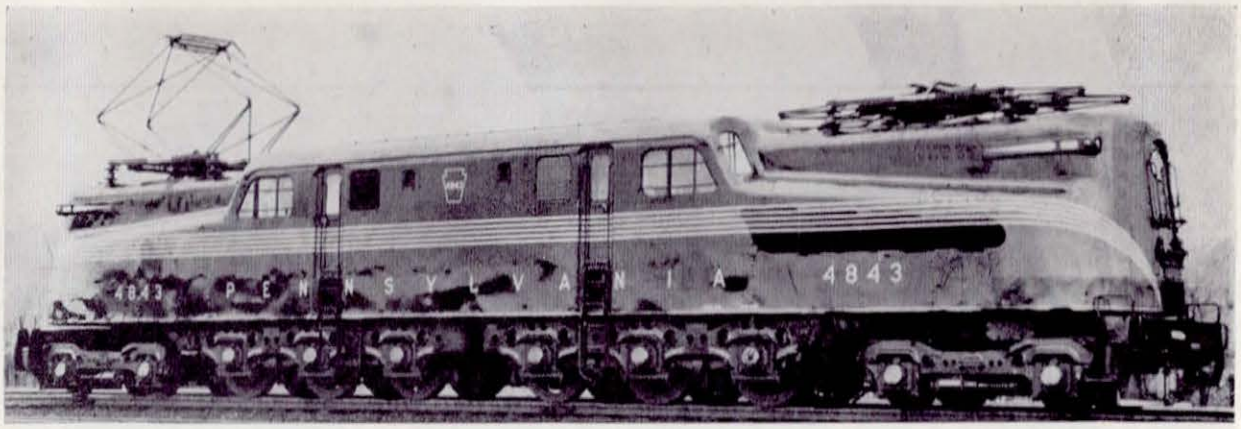
The S-2 geared locomotive proves the practicability of steam turbines for locomotives



One of the Chesapeake & Ohio's three 6,000-hp. steam-turbine-electric locomotives for fast passenger service between Washington and Cincinnati



A 2,000-hp. double-end Baldwin-Westinghouse Diesel-electric locomotive for suburban service



A 4,620-hp. GG-1 electric locomotive on the Pennsylvania for freight and passenger service

motive is well adapted to any application while the others are primarily best suited to slow-speed, heavy-grade service.

The best examples of the a.c. series-motor locomotives are the Pennsylvania class GG-1 and the New Haven class EF3. Nominally rated at 4,800 hp. continuously, these locomotives can deliver up to 9,000 hp. for short periods when necessary. An intemittent output in excess of the nominal rating can be delivered at the rail over the entire speed range of the locomotive. Coupled with this high output is a flexibility of control unmatched by any other locomotive type.

Good examples of a.c. split-phase locomotives are those on the Norfolk & Western and the Virginian. The Virginian also uses motor-generator locomotives, as does the Great Northern.

Progress is continuing on the development of locomotives for electrified roads. A new and larger 3-unit electric locomotive having a continuous rating of slightly more than 8,400 hp. is being planned. It will be fully 25 per cent larger than the present largest electric locomotive in continuous rating and should be ideal for heavy freight traffic. All weight will be evenly distributed on 18 separately powered axles, giving this new giant great pulling power without wheel slippage, making it possible to maintain or improve present schedules without a second locomotive. Electric braking is employed to hold back trains on descending grades and to effect quicker stops with minimum mechanical brake wear. This locomotive, which can be built in standardized units, embodies almost a half century of experience and development.

The service records of electric locomotives in peace and in war have never been excelled. That they are not used more widely in this country is traceable to economics rather than to locomotive performance. High initial capital expenditure for a complete electrification is the main drawback to its immediate extension. In spite of this handicap, the important and interrelated problems of fuel cost and fuel reserves, coupled with demands for operating requirements that can be met only by electrification, may combine to accelerate its return to American railroads. Increasing availability of low-cost electric energy from water power and from highly efficient central-station generating plants using coal or even atomic energy as fuel are long-term favorable factors.

Diesel-Electric Locomotives

The Diesel-electric locomotive, possessing many of the advantages of the straight electric, is currently the most popular of all types on American railways. It represents 95 per cent of all current purchases of locomotives. The Diesel-electric eliminates problems incident to water and coal, provides a smooth flow of power with simple control, is capable of long sustained runs without refueling, and has a high-efficiency prime mover. The Diesel engine has the highest thermal efficiency of any existing power unit. This characteristic contributes to economy of operation and permits carrying fuel supply adequate for long-distance runs. Also the idling and standby losses are low, compared to coal-burning locomotives that must maintain steam.

The electric transmission is really the heart of the locomotive. It has the inherent characteristic of a smooth, continuous and non-pulsating flow of power to the drawbar, eliminating starting shocks and track pounding. With simple control, the full horsepower of the engine can be utilized over the entire speed range of the locomotive. Like the electric, the locomotive weight can be used for adhesive purposes since the entire weight is distributed over a large number of wheels, any or all of which may be powered with electric driving motors.

The Diesel has found its widest usage and gained its earliest popularity in switching service, where it has no equal from the standpoint of either performance or economy. Diesel engines of moderate capacity can be employed on switchers because the torque-amplification feature of the electric transmission permits using full engine horsepower at low speeds. High availability reduces the number of locomotives necessary.

Manufacturers have standardized the design of switching locomotives to the point where three sizes satisfy practically all requirements of the railroads. The principal characteristics of these three standard units are as shown in Table 1.

Table 1—Characteristics of Standard Diesel-electric Switching Locomotives

Engine horsepower	660	1,000	1,500
Total locomotive weight—tons	100	160	125
Overall length—ft.	46	46	58
Weight per driving axle—lb.	50,000	50,000	62,500
Starting tractive effort—lb. 33⅓ per cent adhesion	66,700	80,000	83,300
Continuous tractive force—lb.	34,000	34,000	42,800
Continuous speed—m.p.h.	5.3	9.0	10.5

For economy of manufacture and to provide maximum flexibility of application, Diesel-electric road locomotives are made up of standarized power cabs or units of 900,- 1,350-, 1,500-, 2,000-, or 3,000-hp. rating. A recent survey showed that these units are combined to form road locomotives approximately as shown in Table 2. Generally speaking, locomotives of 5,400 to 6,000 hp. are used where grades are severe.

Locomotives made up of 2,000 hp. Diesels are generally used in passenger service. Those using 1,500-hp. engines are more popular for freight service because greater motor capacity is provided in proportion to the Diesel engine horsepower.

The demand has continually grown for increased horsepower in a single engine ever since the introduction of Diesel road locomotives. Today locomotives employ engines having a maximum rating of 2,000 hp., and more is desired.

Gas-Turbine Locomotives

One might infer from the records of good performance of the electric, steam, and Diesel locomotives that there is no field for other types of motive power. Such is not the case. The search continues for something better, and the gas-turbine-electric locomotive now being energetically developed by many builders has exciting possibilities, particularly in the larger sizes of road locomotives. Several companies are actively engaged in the development of such locomotives, with some efforts being directed toward a coal-burning type and others toward a liquid-fuel type.

The gas-turbine locomotive has conspicuous merits. Larger horsepower can be concentrated in small space. There are no reciprocating parts and no troublesome shock and vibration problems of the type that reciprocating motion imposes. The consumption of lubricating oil is materially reduced. The gas turbine can burn any kind of liquid fuel, although not with uniform efficiency. The unit requires no water and has no ash problem. The gas turbine is the essence of simplicity and compactness and offers unequaled accessibility for service. While the fuel economy of the present type is not as good as for Diesel engines, the difference in fuel consumption is offset by its many advantages. The gas-turbine-electric makes possible the construction of locomotives with two thirds the weight and one half the length of present Diesel-electrics of similar horsepower rating.

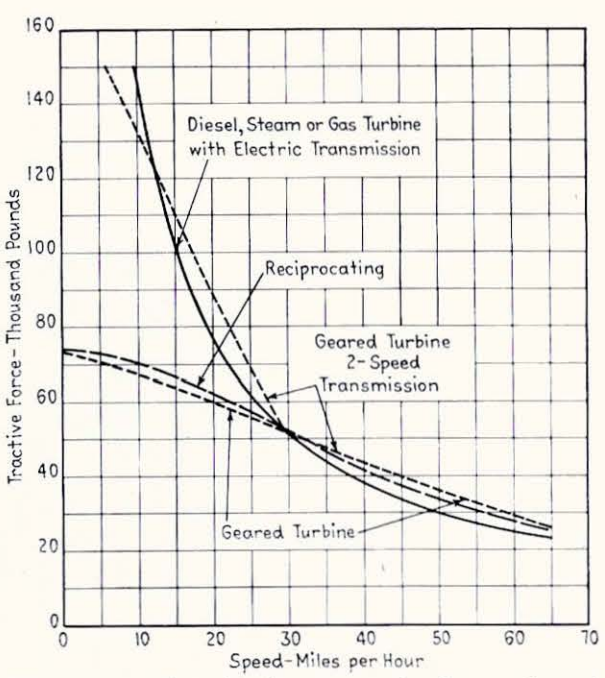
A surprising characteristic of the gas turbine is that it develops considerably more power in cold weather than in hot weather, because the air is of greater density. For example, a gas turbine that develops 2,000 hp. when the air is 80 deg. F., develops 2,500 hp. when the temperature falls to 10 deg. above zero. This characteristic makes this form of locomotive particularly suitable for operation in cold climates.

The fundamental theory of the gas turbine was developed in the late 1800's. It was not applied more quickly simply because materials have not been available to withstand the high temperatures necessary to make the unit practicable. At 800 deg. F., the gas turbine develops only enough power to drive itself. Useful work is performed only to the extent that higher temperatures are used.

In the gas turbine the products of combustion are used directly in the turbine at temperatures well above 800 deg. F.—the higher the temperature, the more efficient the operation. The size of a turbine for a given output is intriguing. A 2,000-hp. power plant now on test and suitable for locomotive use is only 26¼ ft. long, 3½ ft. wide and 6 ft. high. Two such units might be placed side by side in a locomotive, with a center aisle, permitting 4,000 hp. of prime mover capacity in approximately 26 ft. of locomotive cab length. Each unit consists of a compressor, combustor, turbine, gear unit, and generator, assembled in that order from the compressor end. The

Table 2—Popularity of Diesel-electric Locomotive by Sizes

Number Units or Cabs	Locomotive Horsepower	Per cent Total Locomotives
1	1,350–1,500	8
1	1,800–2,000	10
2	2,700–3,000	19
2	3,600–4,000	14
3	4,050–4,500	20
3 or 4	5,400–6,000	29



Characteristic relationship between tractive force and speed for various types of locomotives

Table 3—General Comparison of Road Locomotives†

Factor	Reciprocating Steam	Geared Steam Turbine	Steam Turbine Electric	Diesel Electric	Gas Turbine Electric	Electric
First cost	1	2	4–5	4–5	3	6*
Direct operating expense	6	4–5	4–5	3	2	1
Probability of increase in direct operating expense	5–6	5–6	3	4	2	1
Overall efficiency (fuel to rail)	6	4	5	1	3	2
Probable long range fuel availability	2–4	2–4	2–4	6	5	1
Effect in changing the volume of freight traffic in coal	1–3	1–3	1–3	6	5	4
Output as affected by mechanical condition or fuel	6	4–5	4–5	2–3	2–3	1
Ability to handle increased traffic	6	4–5	4–5	2–3	2–3	1
Freedom from road failure	4–6	4–6	4–6	2	3	1
Length	4	3	5	6	2	1
Weight per h.p.	4	3	6	5	2	1
Maintenance	6	3–5	3–5	3–5	2	1
Time required for servicing at terminals	6	4–5	4–5	2–3	2–3	1
Availability	6	4–5	4–5	3	2	1
Flexibility for use in various localities	1–5	1–5	1–5	1–5	1–5	6

*Includes electric transmission system.
†All factors in this table do not have equal weight. Care should be exercised in referring to this table as the classifications given are general. For a specific railroad, the weighting of these factors could be materially different than shown. Also in generalizing, there are sufficient supporting data for only three of the locomotives listed (reciprocating steam, diesel, and electric). The remainder are based on judgment and predictions hinging upon performance of similar apparatus for other applications; more accurate comparisons must wait for further operational tests.

overall weight is 39,000 lb. for a single gas-turbine power unit.

The gas turbine when used to drive its own compressor has no starting torque. Like the Diesel engine, it must be started by auxiliary means. This characteristic compels the use of electric transmission, or two turbines, one to be used for traction.

To be entirely practicable for locomotives, the service life of a gas turbine must approach that of the steam turbine, which has been perfected to the point of running for long periods without shutdown. When such gas turbines are produced, we can expect them to be a part of locomotives having high availability and low maintenance expense.

The 2,000-hp. gas turbine is easily adaptable for high-speed, heavy-duty passenger service. In a single cab weighing 225 tons, two such turbine-generator sets can be installed. These sets, placed side by side, consume less than 60 per cent of the total cab length, leaving the remainder of the cab for other necessary apparatus. Two such cabs could be connected together to form an 8,000-hp. gas-turbine locomotive for heavy freight service. Gearing naturally can be applied to provide the proper speeds for the service required. Speeds up to 120 m.p.h. for passenger service and 70 m.p.h. for freight service are easily possible. With this type of locomotive, the weight per horsepower developed would be considerably less than that of other self-propelled locomotives.

If coal can be used as a fuel, the gas turbine may become a serious contender to all other types of motive power. The burning of coal satisfactorily in a gas turbine is no easy problem and the solution is somewhere in the future. In the meantime oil will be used as fuel.

The gas-turbine locomotive will not be exceptionally low in cost. It will definitely be more than steam power; probably more nearly that of Diesel power. The prime mover is constructed from about the highest priced structural material known. Precision manufacture of all parts is required.

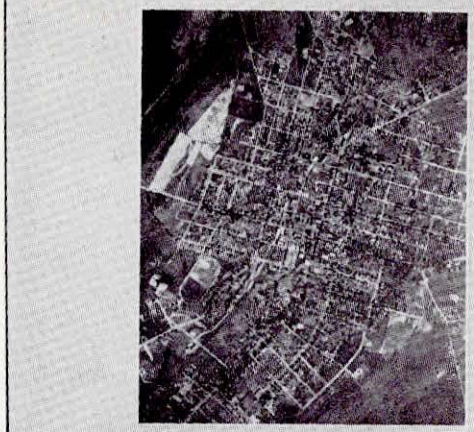
The railroads, by meeting the five basic requirements of modern transportation—cost, speed, convenience, safety, and dependability—will continue for a long time to come to be our chief means of transport. Existing motive power of all types will continue to serve the railroads and will undergo improvements and modifications. New forms may appear to meet changing times and conditions.

Costs, both initial and operating, thermal efficiency, horse-power per ton, speed, availability, overload capacity, fuel cost, and maintenance, are some of the more important standards by which locomotives are judged. Improvement of existing locomotives and design of new ones will be based on improving one or all of these factors. There is every reason to believe that this can and will be done.

TEST RUN ON THE EAGLE MOUNTAIN RAILROAD. — Oliver Olson, in charge of operations and maintenance on the new Kaiser Company ore railroad (described in *Railway Age* of December 11, page 60), is shown in the cab of a Diesel locomotive which handled 360 tons down 19 mi. of two per cent grade using only dynamic brakes. The locomotive is a Baldwin 1,500-hp. road switcher

SHORT LINE SELLS ITS SERVICE

Chesapeake Western campaigns to develop industry in Shenandoah Valley



Virginia's Shenandoah valley is known principally for its history, its scenery and its agriculture. But if the industrial development program recently initiated by the Chesapeake Western proves successful, the southern part of the valley, at least, may eventually become as well known for its industry.

As an initial step in its development program, the C. W. has prepared an attractive booklet of 16 pages plus cover, "South Shenandoah Valley of Virginia," outlining the attractions of the area as a location for industry and for homes. This booklet, 9 in. by 12 in. in size, and printed in three colors, is profusely illustrated with pictures, graphs and maps. It contains sections on location, climate, resources (with special emphasis on electric power, coal and timber), transportation facilities, labor supply, government and living conditions. It was prepared under the direction of D. W. Thomas, of Harrisonburg, Va., president and general manager of the Chesapeake Western, assisted by Robert Nelson and Linwood Rice, public relations counselors of Richmond, Va.

The first edition of this short line's booklet has been mailed, with a personal letter from Mr. Thomas, to a selected list of approximately 1,000 industrial concerns of types which might find it advantageous to establish additional or branch plants in the road's territory. A revised edition of the booklet, now in course of preparation, will be sent to an additional list of between 1,000 and 2,000 companies. The letter accompanying the booklet states in part that "Peaceful labor conditions, good climate, pleasant living conditions, and other advantages offer a unique opportunity for location of industry in this area. . . . Certain sites along the Chesapeake Western Railway afford excellent opportunities for plant expansion, and fit ideally into the government's desires for decentralization of industry."

As a further step in its industrial development program, the company has engaged the services of Richardson Wood, community economic consultant.

The campaign is being undertaken by the Chesapeake Western as a service to its territory, and as a means of increasing and balancing its own traffic, which is now about 80 per cent inbound. There is already some industry in the territory—three furniture, two textile and several cinder block plants, some cattle auction warehouses and a thriving poultry business valued at $20 million per year for Rockingham county alone. These industries, however, produce comparatively little carload traffic to balance the inbound volume.

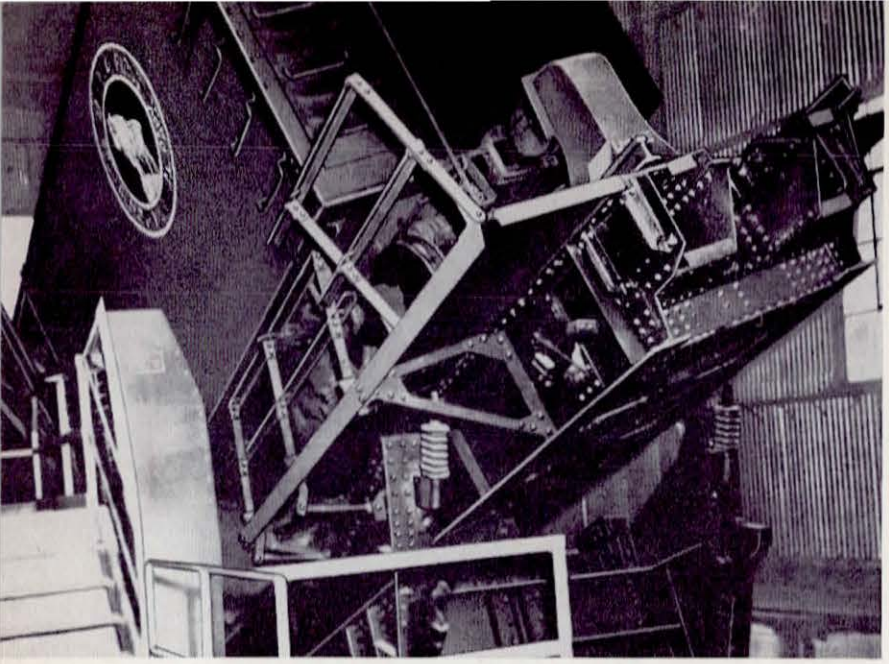
The Chesapeake Western operates 53.5 mi. of single-track main line from Elkton, Va., through Harrisonburg to Bridgewater, and from Harrisonburg to Staunton, plus 10.6 mi. of sidings and yard tracks. It connects with the Norfolk & Western at Elkton, with the Southern at Harrisonburg and with the Chesapeake & Ohio at Staunton. It operates its own shops at Elkton, and has about 85 employees. Its motive power is entirely Diesel—three 100-ton, 660-hp. Baldwin switchers.

In September, 1947, a contract was awarded for installation at a cost of approximately $10,000 of Motorola FM two-way radio at each agency station, at the general offices in Harrisonburg, and on all three locomotives. The Chesapeake Western thus may have won the distinction of having been the first railroad in the world to handle all its communications, including dispatching and train orders, by radio.

In 1947, the C.W. handled 8,146 loaded cars, and 299,912 tons of freight an average of 23.12 miles, for a total of 6,933,000 revenue ton-miles. Total revenues, in round figures, were $407,000, of which $335,000 was from freight. Operating expenses were $303,000, taxes $38,500, equipment rents $22,000, fixed charges $29,500, and other income $2,000, leaving net income of $16,000. The operating ratio was 74.48.

For the first nine months of 1948, its showing was even better than in the corresponding period of last year, comparative figures being as follows:

	Nine months ending September 30 (000 omitted)	
	1948	1947
Operating revenues	$330	$303
Operating expenses	211	217
Net from railway operations	$119	$ 86
Taxes	28	18
Rents (net)	16	17
Net railway operating income	$ 75	$ 51
Other income	5	2
Fixed charges	21	23
Net income	$ 59	$ 30
Operating ratio	63.95	71.64



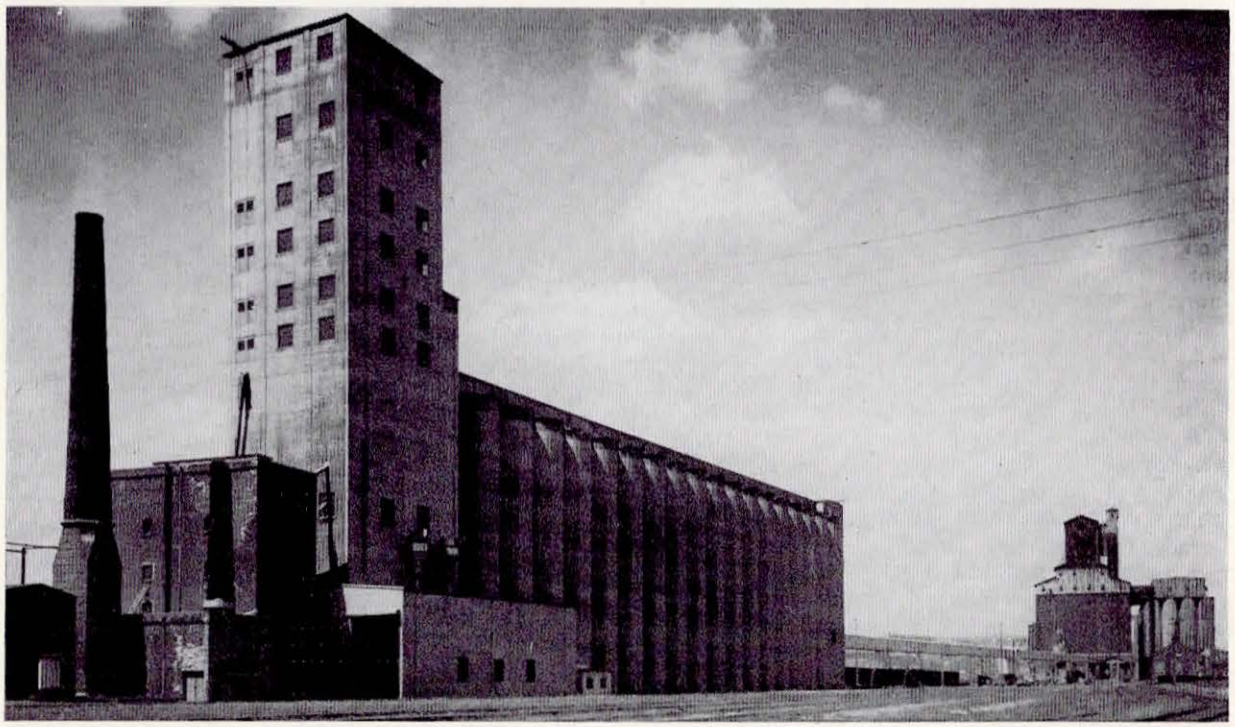
SPEED UNLOADING OF

Car dumper installed by Great Northern at Superior, Wis., makes a clean sweep of seven or eight cars or as much as 15,000 bu. an hour — Reduces labor and cuts handling costs

The new Great Northern car unloader in action—one side tilt, and three end tilts as shown, clear all grain from a car in three to four minutes

The unloading of grain cars during the recent harvest was greatly expedited with a substantial saving in labor at the Great Northern's grain elevators at Superior, Wis., as a result of the installation of a mechanical car dumper which, in four tilts, all electrically controlled, empties the grain from a fully loaded box car in from three to four minutes. All operations included, the new machine unloads seven to eight cars, or approximately 15,000 bu. of grain, per hour. In addition to lowering the labor cost of unloading cars, the use of this machine expedites the release of cars, making them available promptly for reloading with grain or for other transportation service.

The Great Northern's grain elevators at Superior are located on St. Louis bay, adjacent to Lake Superior. The main headhouse, known as Elevator "S," is of structural steel construction and has a storage capacity of 3,100,100 bu. This headhouse is located adjacent to a slip of sufficient depth to accommodate the largest lake carriers, which are loaded by means



Elevators "X" and "S", showing the car unloader house just left of center, and the elevated belt conveyor gallery extending between the two units

GRAIN AT HUGE ELEVATOR

of 16 shipping spouts through which grain is discharged by gravity directly from the headhouse shipping bins. Elevator "S" is also provided with a marine leg, by means of which grain may be unloaded from a lake carrier into the elevator at the rate of 15,000 bu. per hour.

Adjacent to Elevator "S" headhouse are located three reinforced concrete storage annexes; namely, Annex No. 1, with a capacity 2,380,000 bu.; Annex No. 2, with a capacity 3,000,000 bu.; and Annex No. 3, with a capacity 3,000,000 bu. The total storage capacity of Elevator "S" headhouse and its three annexes is 11,480,100 bu.

Latest Elevator Added in 1947

Elevator "X," built during 1947, is the newest and most up-to-date of the Great Northern's grain elevators at Superior. It is about 1,200 ft. south of Elevator "S" headhouse, approximately at the site of a former grain elevator of timber construction which was destroyed by fire in 1942. This elevator is of reinforced concrete construction, and is provided with a headhouse having a storage capacity of 91,500 bu. Adjacent to the headhouse is a storage structure consisting of 36 circular bins and 17 interspace bins having a combined storage capacity of 1,255,100 bu. Located just south of Elevator "X" is a grain drier having an operating capacity of 1,500 bu. of grain per hour. The combined storage capacity of Elevators "S" and "X" is 12,826,700 bu., making them one of the world's largest grain depots.

The grain unloading facilities at Elevator "S" consist of nine receiving hoppers, each served by two tracks so arranged that two cars can be unloaded simultaneously into each hopper. Grain is unloaded from the cars by means of power-operated, manually-guided grain scoops. Each of the receiving hoppers is served by an elevating leg, which raises and delivers the grain into the garners at the top of Elevator "S" headhouse for weighing and further handling.

The labor cost of unloading grain at Elevator "S" amounts to about six dollars per car. The comparatively high labor cost of unloading grain by this method was one of the major factors involved in the decision to construct Elevator "X," which is provided with a mechanical car dumper whereby grain is unloaded at a labor cost of about three dollars per car.

Details of Car Dumper

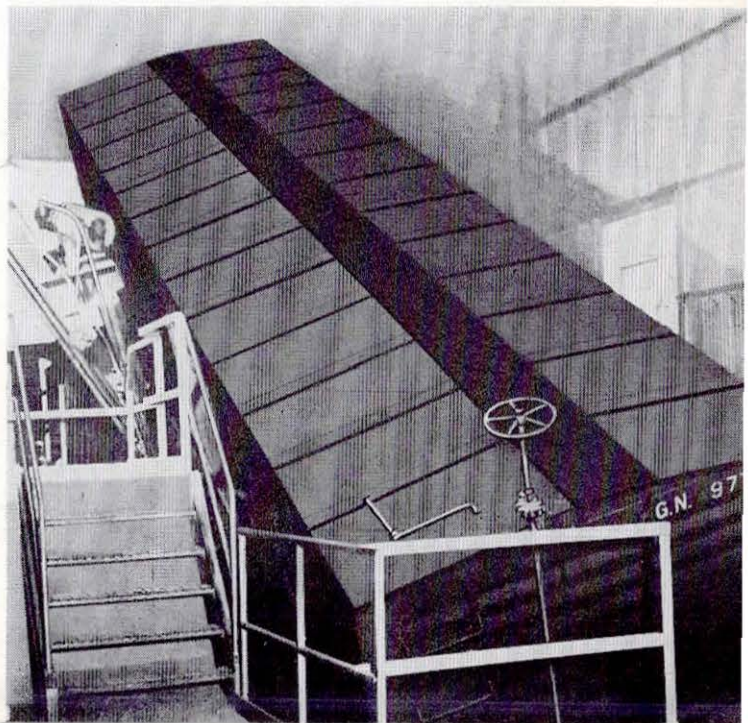
The mechanical car dumper provided at Elevator "X" is a Link-Belt installation of the tilting type. Essentially, it consists of a large reinforced concrete pit constructed below ground level, in which is installed a steel receiving hopper of sufficient size to hold a maximum car of grain, and a movable or tilting car platform 52 ft. long, mounted on rollers to accommodate the end tilting of cars, and fitted with a pivot for the side tilting of cars. Two car-holding clamps secure the car on the movable platform during tilting operations. Also included is a grain-door remover, a clean-out deflector blade, and an operator's platform on which is mounted the electrical control mechanism.

This car dumper, with all of its component parts, is power operated by four electric motors ranging in size up to 30 hp., and all of its movements are controlled by one man. Two additional men are employed to handle the removed grain doors and to sweep out the small amount of grain that may become lodged in a rough car floor or along the lower edge of the car in its final tilted unloading position.

Loaded grain cars are brought to the unloader and spotted on its platform by means of an electrically operated car puller. The unloading operation then begins with raising the retractable car clamps from the platform at each end of the car. They close on the car couplers, center the car, and hold it securely in position on the platform track. Then, under electric control, as the car is first tilted sidewise toward its open door, the grain door remover, which extends up from the operator's platform, pushes the grain door inward and upward, allowing a stream of grain to flow from beneath the door and around its ends.

The grain door remover consists of a sturdy structural steel arm provided with a horizontally pivoted pusher head or plate, the face of which is equipped with numerous steel points or projections which engage the grain door face and provide the contact and friction required to lift the door and push it inward as the car tilts sidewise and the arm is thrust into the car. As the grain continues to discharge, the pivoted head on this arm tilts the grain door to a higher position and holds the removed door clear of

Top view of a car on end—Operator's platform and door pusher are at the left



the stream of grain. At full side tilt the car is at an angle of approximately 15 deg. with the vertical. This operation discharges about 20 per cent of the load.

In the second movement of the car platform, while still maintaining its side tilt, the car is promptly tilted to one end to a maximum angle of 40 deg. to the horizontal, the grain flowing out of the door in a large uniform stream. This operation removes about 50 per cent of the load. Then, in its third operation, the car platform is tilted to the opposite end to a maximum angle of 40 deg. to the horizontal. This operation removes about 25 per cent of the load.

With the high end of the car now completely free of grain, the power-operated deflector blade is thrust through the open door and across the car floor, after which a final tilt of the car platform is made which tilts the car to the opposite end. This final operation discharges the remaining grain, amounting to about 5 per cent of the load, against the deflector blade and out of the car. Any small quantity of grain that remains in the car is quickly removed manually by sweeping it into the receiving hopper.

The dust that escapes from the stream of grain during unloading operations is drawn by fans into a dust-collecting system and discharged into the dust storage bin which receives the dust gathered from all parts of Elevator "X."

As soon as a car has been unloaded, the car platform is restored to its normal level position, the end clamps are retracted into the car platform, and the car is moved off the dumper by means of the electrically-operated car puller. Another loaded car is immediately pulled into position, clamped, and then unloaded in the same sequence of operations. In the meantime the grain unloaded from the preceding car is transferred from the receiving hopper to one of the garners at the top of the headhouse for weighing and further handling.

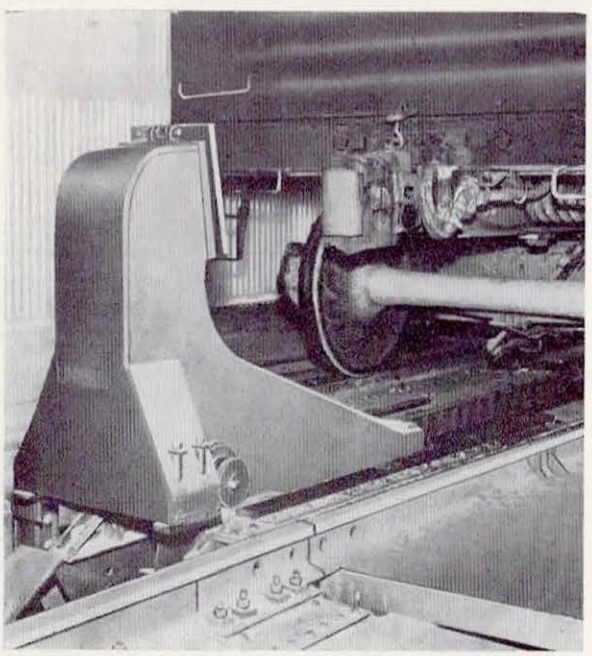
Long Belt Conveyor Between Elevators

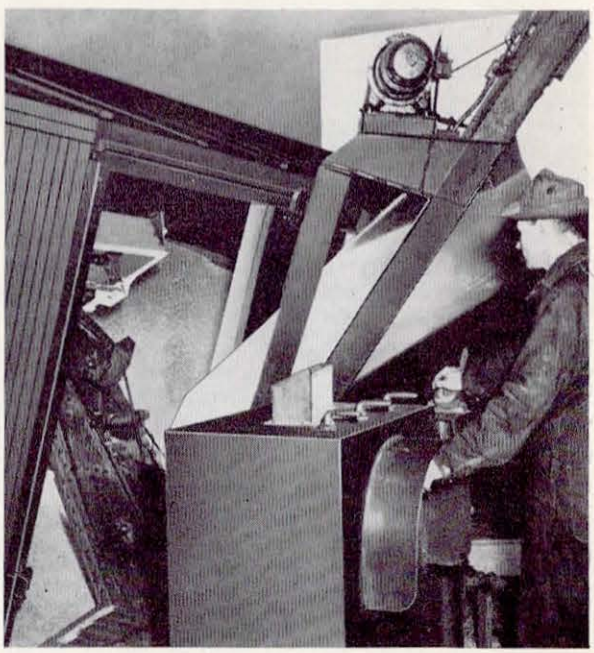
A belt conveyor about 1,200 ft. long, and having an operating capacity of 25,000 bu. per hr., extends between Elevators "S" and "X." This long conveyor is reversible, making it possible to transfer grain from Elevator "X" to Elevator "S" and its three annexes for storage; to deliver grain to lake carriers; or to transfer grain from Elevator "S" to Elevator "X" for storage or for reconditioning in the grain drier located immediately south of Elevator "X" headhouse.

Belt conveyors, elevating legs, and gravity discharge spouts throughout both Elevators "S" and "X" permit the movement of grain to any bin desired for storage or rehandling for cleaning, grading, conditioning, and shipping. Both Elevators "S" and "X" are provided with shipping spouts for loading grain into railway cars.

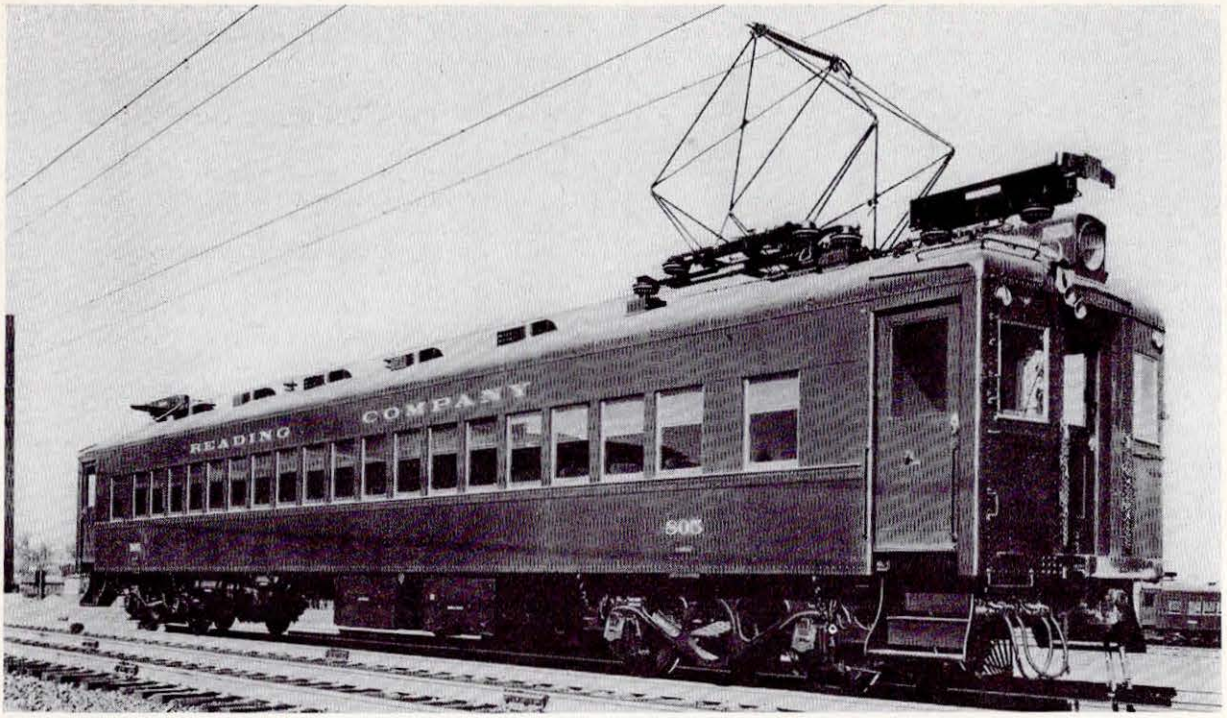
During the four-month period from August to November, 1948, a total of 4,452 cars of grain were unloaded at Elevator "X" by means of the new car dumper.

The grain elevators described are leased to and operated by the Archer-Daniels-Midland Company. The car dumper was furnished by the Link-Belt Company, Chicago, and was installed by the James Stewart Corporation, Chicago, which also built Elevator "X." All the work was done under the general direction of the engineering division of the Great Northern, of which H. J. Seyton is chief engineer.





Left—One of the two end clamps which engage and hold the cars fixed to the platform track during dumping operations. Right—As a car is tilted, a steel arm pushes back and raises the grain doors, allowing the grain to flow out the opening



Motor cars have pantographs and all cars are equipped with a roof-mounted bus and air-operated bus couplers

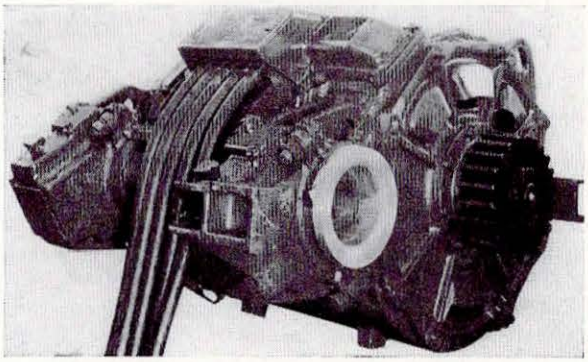
MULTIPLE UNIT CARS FOR THE READING

Electrical equipment of improved design permits new motor cars with converted steam-coach trailers to run in the same train with original m.-u. combination

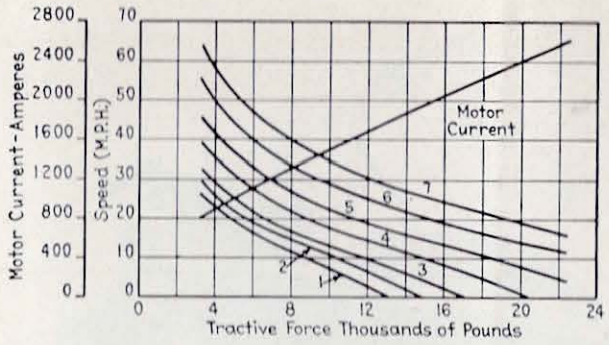
By E. G. FRANK
Control Engineering Division,
General Electric Company,
Erie, Pa.

The Reading will soon place in service eight new motor-trailer car combinations designed for multiple-unit operation from an 11,000-volt, single-phase, 25-cycle, a.c. overhead trolley wire. The motor cars are being manufactured by the American Car & Foundry Co., and trailer cars are being converted by this same company from steam-train coaches furnished by the railroad. Electrical propulsion and control equipment for the two-car units is being supplied by the General Electric Company. From an operating standpoint, the new units will be duplicates of the Reading's present electric suburban equipment, thereby permitting the operation of both old and new cars in the same train. New cars will incorporate the latest design improvements consistent with the operating conditions.

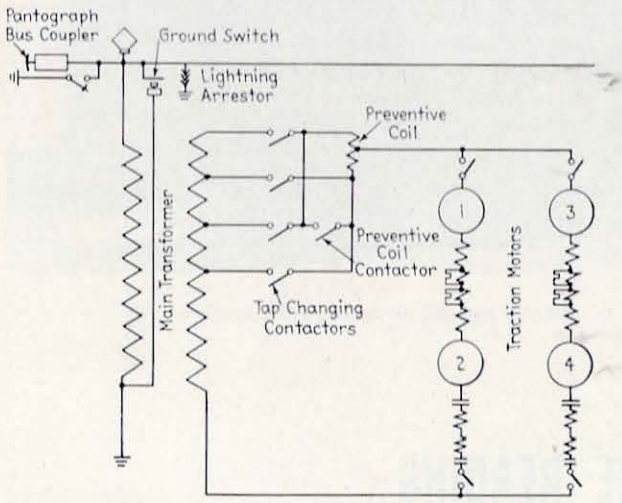
The motor cars are of combined steel and aluminum construction, and will weigh approximately 150,000 lb. complete. They are 72 ft. 11½ in. long, and seat 86 passengers. The trailer cars will weight approximately 112,000 lb., and have a seating capacity of 88



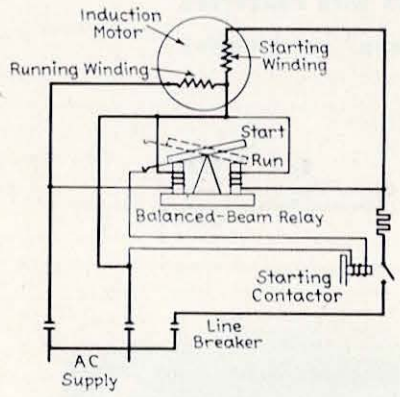
One of the four a.c. traction motors used on each car



Speed-tractive-force curve for a two-car unit



Schematic diagram of main-power circuits



Connections for the "balanced - beam" relay

passengers. Their general exterior appearance will be the same as that of the motor cars. The interior of the cars is painted in three tones of grey. All hardware and light fixtures will have a sanded nickel finish.

Each of the new units will consist of a motor car, powered with four traction motors, and a semi-permanently coupled trailer car. There are operator's stations at both the front and rear of the two-car unit, one station each in the motor and trailer car. The equipment is designed for a maximum operating speed of 70 m.p.h.

Current is collected by means of a sliding-shoe type pantograph. The high-voltage power is transmitted between cars by a roof-mounted bus which is connected between units by an air-operated bus coupler. The motor car contains the complete electric equipment, consisting of propulsion equipment; blowers for cooling propulsion equipment; and auxiliary, control and protective equipment.

The pantograph, lightning arrestor and 11,000-volt bus are roof-mounted; while the remaining equipment is mounted beneath the car. The trailer car contains only the auxiliary, control and protective devices necessary for its own operation.

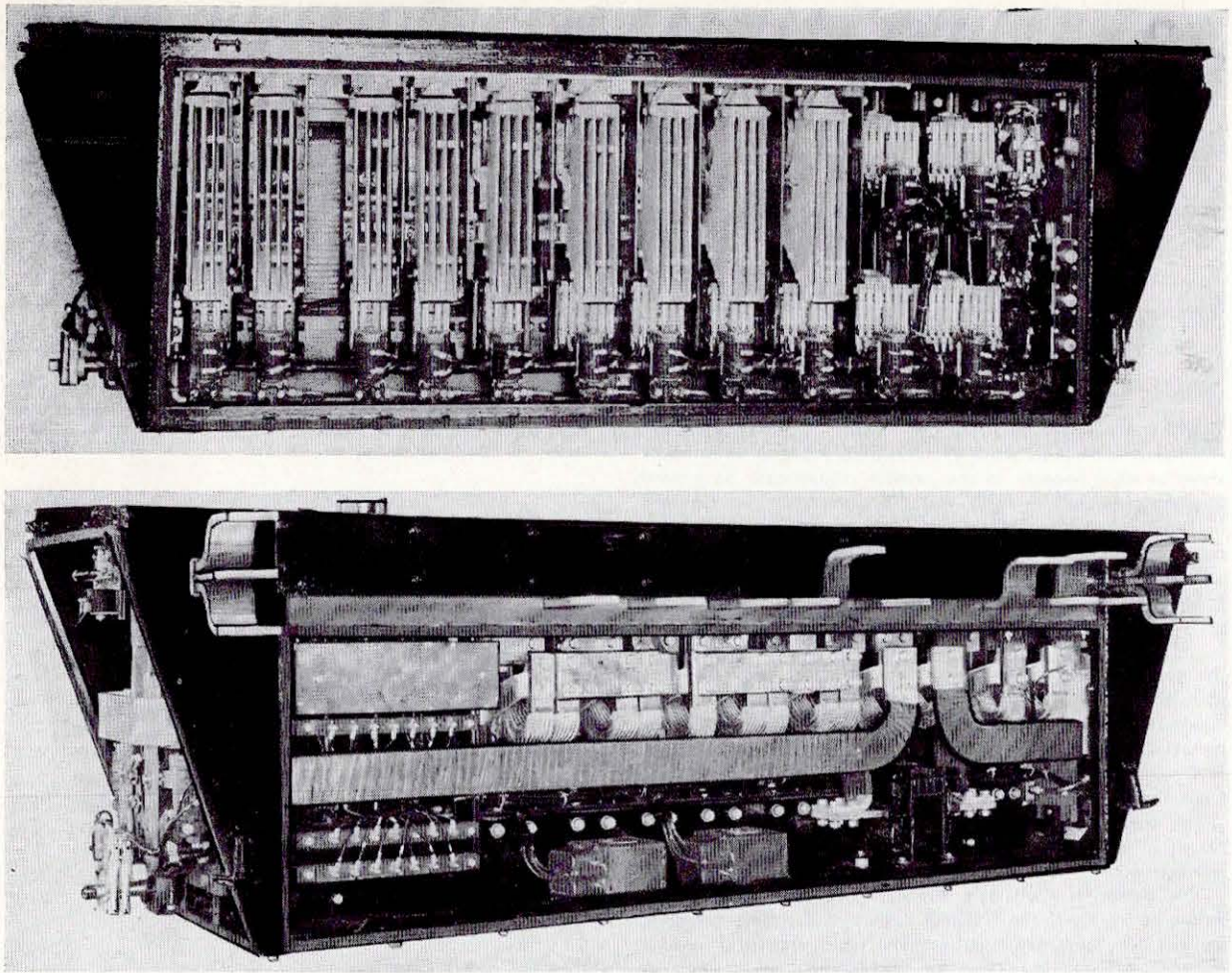
The transformer, located on the motor car, reduces the 11,000-volt power to the proper potential for the operation of motors and auxiliaries. The four traction motors are of the General Electric Company's improved single-phase a. c., series-wound, commutator type. They are connected two in series, with two groups in parallel. Motor speed is varied by connecting the motor circuit to various voltage taps on the transformer secondary.

An "air-core" preventive coil is used to permit continuous application of power during acceleration, to reduce current surges due to voltage changes, and to minimize distortion of the a. c. wave. To assure smooth acceleration, the transformer secondary voltage is increased in seven steps. Four of these are obtained directly from the transformer through contactors as shown in the main power circuit wiring diagram. The remaining three are obtained by having two contactors closed simultaneously across the preventive coil, wihich is then used as a voltage divider.

There are three running speeds which may be selected by the master controller at the operator's station. In normal operation, the controller is placed in the high-speed position, where it can be held by the safety foot switch. With the controller in this position, acceleration through the seven steps takes place automatically under the control of a system of relays and interlocks. A safe and comfortable rate of acceleration is maintained by a relay which prevents the connection of the motor circuit to a higher voltage tap on the transformer until the motor current has decreased to its normal value. This relay is connected through a current transformer to the traction-motor circuit.

Wheel-slip protection is obtained by a relay and auto-transformer combination. When slipping occurs, it results in an unbalance of voltage between the two traction motors connected in series. This voltage unbalance operates the relay, removing power from this pair of motors. A time-delay relay prevents reapplication of power until the slipping has stopped.

Transformer overloads, or a ground in the transformer primary circuit, operate the pantograph relay through current transformers. This relay closes a switch grounding the trolley, and thereby opening the substation breakers. After power has been removed from the line, the pantograph is automatically lowered and cannot be raised until the relay has been



Front and rear views of the main control group

manually reset. Unless the fault has been corrected, the relay will again ground the trolley, and lower the pantograph. A time-delay feature on the relay prevents operation due to momentary interruptions of power. A ground on the secondary of the transformer energizes a relay which warns the operator by means of an indicating light and inserts a high resistance in the transformer secondary ground detector circuit. This feature permits the car to proceed to its destination, thereby avoiding unnecessary delays on the road.

Excessive transformer temperatures operate a thermostatically controlled relay which removes the traction-motor load from the transformer. This relay must be manually reset after the transformer temperature has decreased to a safe value.

Pressure-operated air relays are installed to measure the air pressure in the ducts leading to the transformer and to each pair of traction motors. The transformer air relay prevents the closing of the traction-motor contactors until sufficient cooling air is being delivered to the transformer. The air relay for each pair of traction motors prevents the application of power to them unless there is sufficient cooling air.

The traction-motor blowers are driven by induction motors, while the transformer blower is mounted on a shaft extension of the auxiliary motor-generator set. All of these driving motors are of the single-phase, squirrel-cage type using resistance split-phase for starting. The starting contactor of each motor is controlled by a "balanced-beam" relay. This holds the starting contactor closed during initial acceleration and then opens it as running speed is approached. The relay contact opens when, because of decrease in the motor-starting current, the voltage across the starting winding approaches full-line voltage. This, in turn, opens the starting contactor and leaves the running winding of the motor across the line. The relay contact remains in the open position due to the fact that full-line voltage is induced in the starting winding by "transformer action" with the running winding.

The cars are to be placed in service on the Reading's $20,000,000 Philadelphia suburban electrification which handles the railroad's heaviest commuter traffic. It is expected that the advances in design and construction incorporated in these units will be reflected in improved performance and increased economy or operation.

HOW UPS AND DOWNS OF GENERAL BUSINESS AFFECT RAILROAD PERFORMANCE

Significant findings in comprehensive study of cycles' effects as revealed in railroad statistics

By THOR HULTGREN
Member, Research Staff,
National Bureau of Economic Research

A BONANZA OF ECONOMIC INFORMATION

The National Bureau of Economic Resear.h (1819 Broadway, New York 23) has for many years been engaged in an intensive study of what happens to the country economically as general business conditions swing upward and downward. Thus learning, in detail, what these swings are likely to do is the first step in an orderly effort to circumvent as much as possible the unpleasant consequences of "boom and bust."

The bureau's inquisitive searchlight has now been played upon the rich mine of statistics afforded by the railroad industry —and the author of this article is the analyst assigned to the task of putting order into these figures, and reporting what they reveal. His complete report is being published this month by the bureau as a book, entitled "American Transportation in Prosperity and Depression"— and this article is a summary and preview of the story revealed by the complete report.

The charts appearing here are a sampling of the 133 contained in Mr. Hultgren's book—most of them novel and highly instructive.

The author is thoroughly familiar with railroad statistics. Before he went with the National Bureau of Economic Research, he was for three years an economic and statistical analyst for the I.C.C. Prior to that he was for nine years a transportation economist for the Department of Agriculture. He did his graduate study at Columbia University and at the Robert Brookings Graduate School of Economics and Government, his research field at both places being the railroad industry.

While the charts in this study go no farther than 1940, in his article Mr. Hultgren notes some of the changes which have occurred since that time. Recency is not, however, the significant point about th's study. There are lots of recent statistics, and older ones too, which serve little useful purpose because they have never been organized to reveal their full significance, and Mr. Hultgren has now largely supplied that organization in a way to provide striking revelations of permanent usefulness to all railroaders of an analytical turn of mind.—EDITOR

The statistical record of American railway transportation is uniquely rich in comparison with that of other industries. Output (ton-miles and passenger-miles), input of labor and fuel, utilization and repair condition of equipment, operating expenses, taxes, net earnings, and other features can be studied, most of them month by month over fairly long periods. Such a record is especially valuable to students of business cycles. The data permit comparisons among a number of cycles with respect to changes in cost and efficiency, the relation of investment in equipment to the rate of growth in an industry's production, and other questions bearing on the process by which prosperity and depression are generated.

As part of its program for quantitative empirical investigation of business cycles the National Bureau of Economic Research has made a study of the statistical materials on the transportation industry. Since there is little long-range usable material on other branches of transport, most of the findings pertain to railroads. We believe they will be of interest not only to specialists on cycles and other economists but to transportation officials, business executives, traffic men, commerce counsel, and the regulatory authorities. They and the underlying facts and procedures of investigation are described in my report. "American Transportation in Prosperity and Depression,"* which the bureau is currently publishing.

Phases and Cycles

Our idea of a cycle may be illustrated by our statistical treatment of the movement of freight. We collect the month-by-month figures on ton-miles for as long a period as possible, adjust them for seasonal variation, and chart them. They make a wavy line; each wave we recognize is at least fifteen months long, usually longer. We mark the dates at which the waves appear to reach peaks and troughs. The period from each trough to the following peak we call a *specific expansion* (specific, that is, to ton-miles); the period from each peak to the next trough is a *specific contraction*. Either a contraction or an expansion is a *'phase'*; two successive phases are a *'cycle'*.

Burns and Mitchell of the National Bureau have established a set of reference dates that mark off expansions and contractions in American economic activity at large, rather than in any one 'specific' activity. When we compare the specific cycles in ton-miles and those in passenger-miles with the reference cycles, we find that the cyclical history of the railroads has been broadly similar, to that of business at large, as one might expect. Since the depression of 1908, every business expansion and contraction has been accompanied by a more or less corresponding rise and fall in freight and in passenger traffic.

Before 1908, as far as we can tell from less adequate records, traffic sometimes continued to grow during a

*Studies in Business Cycles, No. 3, National Bureau of Economic Research, New York, 1948. 432 pages, 151 tables, 133 charts. $5.

business contraction. But in most such instances it grew less rapidly than during the preceding or following business expansion. Up to the end of the first world war, however, the railroads, even when they did suffer a contraction, usually emerged from each complete cycle with a net gain in traffic. Each peak tended to overtop earlier peaks. Skipped contractions, and peaks transcending earlier peaks, are common features of industries that are winning themselves a more important role in the national economy over the years. Between the two world wars, high points in railroad traffic never exceeded previous high points by any wide margin, and sometimes fell short of them. In this period one must turn, in the transportation field, to highway, pipe line and air line traffic to find contractions missing and peaks transcended. During the second war, of course, both railway ton-miles and railway passenger-miles once more exceeded all previous records.

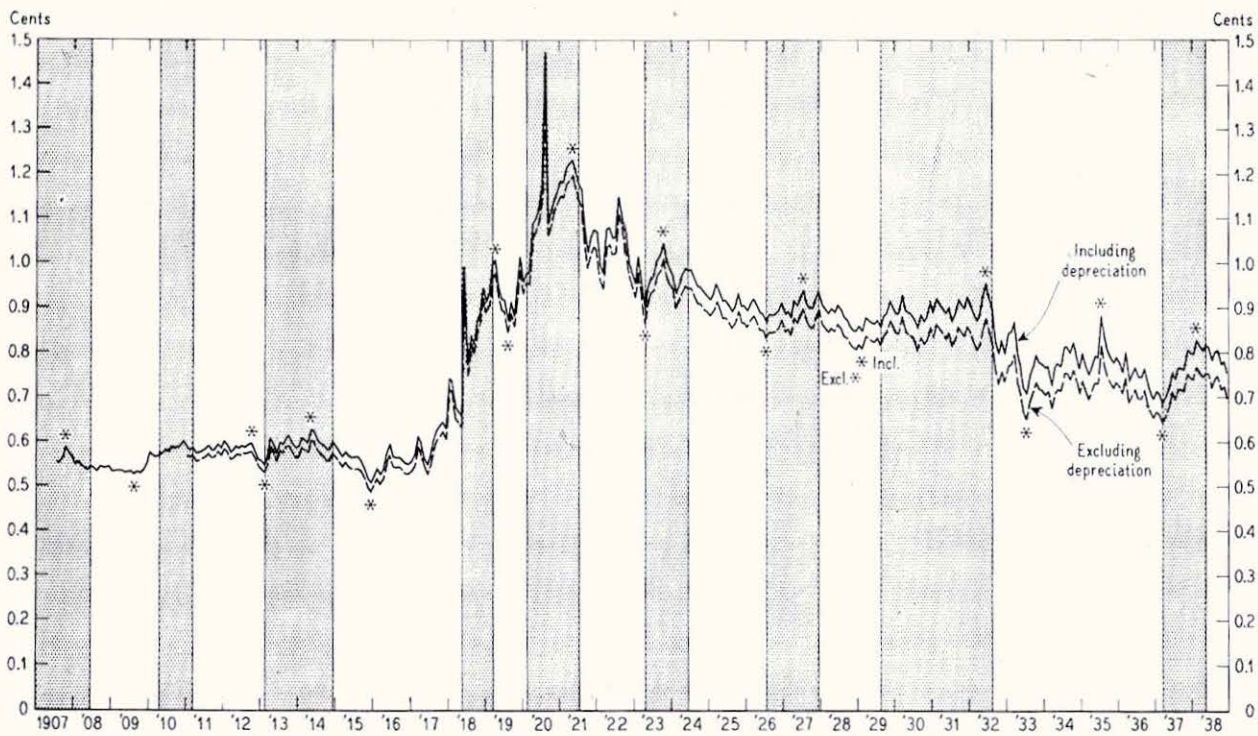
Cycle Variations

The cycles on our traffic graphs vary greatly in the time they lasted and in the size of the disturbance. So do the expansions, considered separately, and the contractions. The movement of freight diminished 31 per cent from 1937 to 1938, but only 10 per cent from 1926 to 1927. The latter contraction lasted only 17 months; the 1929-32 contraction persisted for 35 months. Simple observation of these cycles does not by any means suggest that prosperity and depression tend to recur at uniform and regular periods. If there is such a 'periodic' cycle the deviations from it are remarkably wide.

Cycles in railroad passenger travel tend to be milder than those in freight traffic: the percentage variation between peaks and troughs is smaller. Fluctuations in highway and street car travel are also mild.

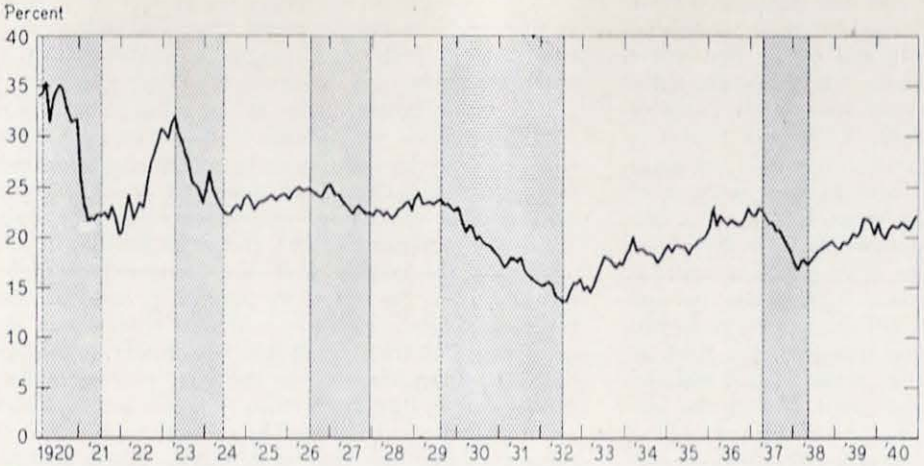
Like traffic figures, ratios of operating performance, such as ton-miles per car-mile or train-miles per train-hour, can be charted month by month and examined for cyclical variation. They show that cycles in traffic have marked effects on railroad operating efficiency. When the movement of l.c.l. freight is growing in the aggregate, the average load in a merchandise car increases; when the aggregate shrinks the load per car becomes smaller. There is a similar tendency in the case of carload freight, but it is less regular, and seems to result from changes in the kind of commodities carried rather than from changes in the average loads of individual commodities. The average trainload quite regularly rises and falls with traffic. These changes tend to improve performance per train-hour and reduce cost per ton-mile during expansion, with opposite effects in contraction.

On the other hand, growth of traffic causes congestion, tends to reduce train speeds, and in this way tends to reduce performance per train-hour in expansion, improve it in contraction. In some expansions this is a mere tendency; better motive power, track, and signaling made it possible for the average speed of trains during expansions to remain as high as at the traffic trough, or even to increase a little, although not as fast as in contractions. In passenger service there was less conflict between the two tendencies. The ratio of passenger-miles to car-miles and to train-miles improved when aggregate passenger-miles increased, fell when they diminished. Speed, on the other hand, appar-



Shaded periods are contractions in traffic units.

Operating Expenses Per Traffic Unit, July, 1907, to December, 1938



Shaded periods are contractions in revenue ton-miles.

Freight Locomotive-Hours in Trains—Percentage of Total Serviceable Hours, 1920 Through 1940

ently improved at almost the same rate in expansions as in contractions.

We attribute the fluctuations in load per car and per train largely to an effort on the part of the railroads to maintain standards of service. If merchandise cars were loaded as heavily in a depression as they were during prosperity, the forwarding of l.c.l. would be delayed. If trains were filled out to prosperity tonnage the departure of both l.c.l. and c.l. cars would be retarded.

Relation to Car Supply

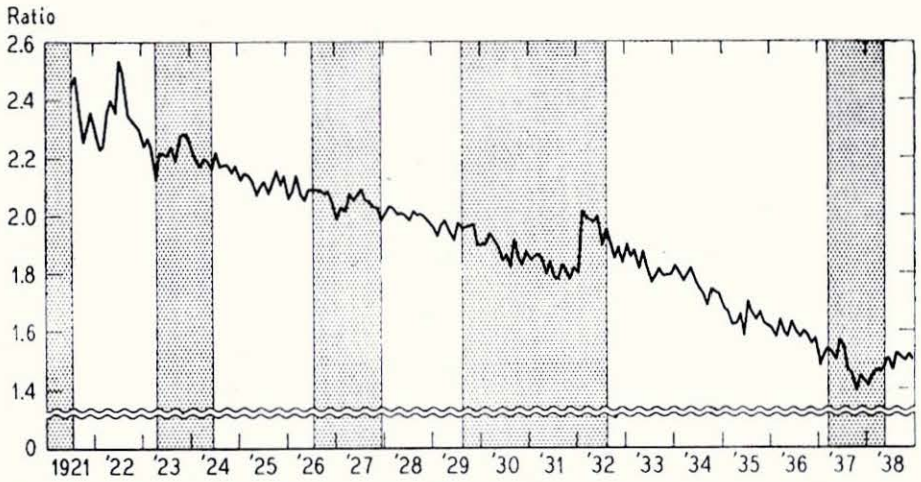
Some of the most striking fluctuations in equipment ratios occur in the percentage of time equipment is in use. Both locomotives and cars spend a much higher proportion of their time in trains or in other useful positions during prosperity than during depression. Partly as a result of net favorable changes in performance per vehicle-hour but largely as a result of greater useful time, there is a steady rise in ton-miles per car-month or car-year, and in ton-miles per locomotive-month or year during an expansion of freight traffic. The railways get more and more work out of the average vehicle. They do not need to increase their stock of cars and locomotives in proportion to their traffic.

Usually, however, the railroads have ordered new equipment somewhat more frequently during expansions than during contractions. But deliveries, of course, lag behind orders. Old equipment often has been retired more rapidly in expansions. The net result has been that equipment stocks have not consistently increased or decreased with traffic. Before 1920, when there was an upward trend in the size of the supply of cars, it often proceeded more rapidly in contraction. Since then, the trend has been downward, and the number and aggregate capacity have sometimes diminished more rapidly in expansion. These remarks apply to the comparatively short periods of traffic cycles; over much longer periods the direction of change in traffic and in vehicle supply was similar.

Statistics of unserviceable equipment show that mechanical departments tend to postpone repairs during contractions of traffic, especially during severe contractions. When the intensity of use diminishes the number of cars and locomotives rendered unusable each month must diminish also; yet the number in need of repair tends to rise. The accumulation of repair jobs does not jeopardize service; in every contraction in which the amount of serviceable equipment declined, traffic declined by a greater percentage. In expansions, unuseable stock is reduced in two ways, partly by repairs and partly by retirements. Deferring the choice between these alternatives permits a more fully informed decision. Successive improvements in the design of new equipment can be taken into consideration. Because of shifts in industry or strengthened competitive power of other carriers, part of the contraction losses of traffic may prove to be permanent. Revival of business will indicate more clearly how much rolling stock will eventually be needed.

In discussions of business cycles considerable interest has focused on questions about the cost of production. According to one school of thought cost is inversely related to volume. Expansions of output are accompanied, they hold, by diminishing cost per unit of output; contractions are accompanied by rising unit cost. According to another school, the first may be right in the early stages, but unit cost tends to rise as full employment of labor and plant approaches. Prices of materials and supplies rise, they believe, and efficiency deteriorates. Toward the end of a contraction efficiency improves, and with falling prices, produces a decline in unit cost.

Cost per unit depends in part on the physical relations between input of man-hours and materials, on the one hand, and output of finished product on the other, and in part on the wage-rates and prices an industry must pay. To investigate the physical relations in the railway field we needed a measure of total output; to make one we multiply passenger-miles in each month by 2.4 (the 60-year average ratio of revenue per passenger-mile to revenue per ton-mile) and add the product to ton-miles for the month to determine the number of 'traffic units' produced. We divide traffic units by man-hours to gage the 'productivity' of labor. The ratio of traffic units to man-hours tends to rise from cycle to cycle, because of continuous improvement of rolling stock, roadbed, repair facilities, and operating



Ratio of Revenue per 100 Traffic Units to Straight-Time Hourly Earnings, July, 1921, to December, 1938

Shaded periods are contractions in traffic units

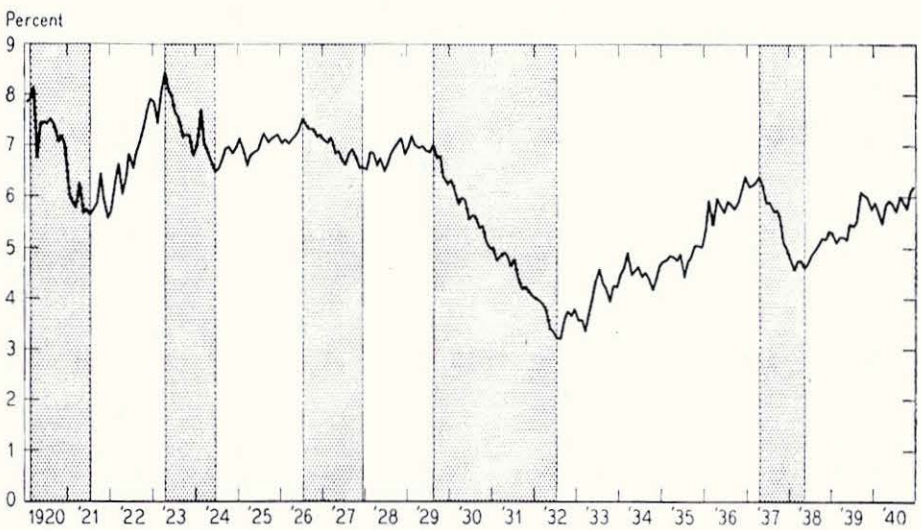
methods. It was higher at the end than at the beginning of each expansion studied. But it was also lower at the end of each contraction, except 1929-32. The fall in contraction shows that volume as well as technological improvement is important. The influence of volume reinforces that of technology in expansion, opposes it in contraction. In 1929-32 output per man-hour was roughly constant; technical progress just barely offset the tremendous loss of business.

An output-to-input ratio could rise during part of an expansion in traffic, lose part of the rise toward the end, and still show a net gain for the expansion phase as a whole. To investigate the possibility of reversal, we divide each phase into five groups of months, strike an average output-to-input ratio for each group, and compare these averages. In the four cycles for which we have monthly figures, we do not find a consistent fall toward the end of expansion, nor a consistent rise toward the end of contraction. We do, however, find that gains in 'productivity' were more rapid in early than in late stages of expansion, and losses more rapid in early than in late stages of contraction.

The 'productivity' of train fuel likewise tended to vary directly with the volume of traffic. The ratio of revenue ton-miles to tons of coal or its equivalent consumed in road freight service fell in 3 of 5 contractions studied. In the other two, technical progress in fuel economy prevented an actual decline, but loss of traffic slowed the rate of improvement. In all expansions the ratio increased. The ratio of passenger-miles to tons of coal or equivalent burned in road passenger service invariably rose and fell with aggregate passenger-miles. In the case of fuel consumption, changes in productivity did not consistently taper off toward the end of a phase.

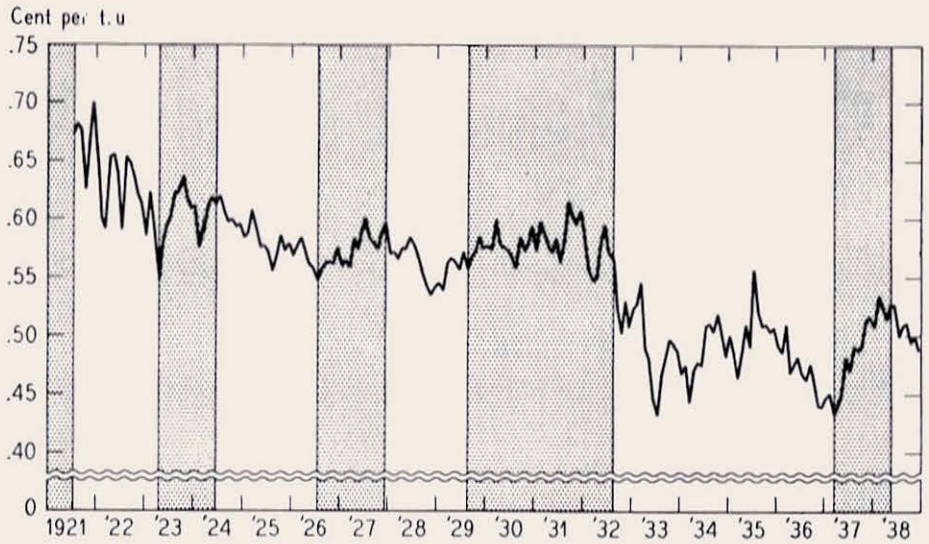
The ratio of overtime man-hours, an expensive component, to total man-hours tended to rise in expansion, fall in contraction. On the other hand, the percentage of man-hours paid for but not worked tended to fall in expansion, rise in contraction. Both tendencies were considerably modified by technological change. In dollar terms, total labor expense per traffic unit usually diminished in expansions, rose in contractions.

The railroads meet changes in their labor require-



Loaded Freight Car-Hours in Trains — Percentage of Total Serviceable Hours, 1920 Through 1940

Shaded periods are contractions in revenue ton-miles.



Shaded periods are contractions in traffic units.

Compensation of all workers per traffic unit, July, 1921, to December, 1938

ments by varying the hours worked per man per month as well as by taking on or laying off workers. Since aggregate man-hours increased by a smaller percentage than traffic units when the latter expanded, and since the number of men at work increased by a smaller percentage than man-hours, the number working increased by a smaller percentage than traffic. Conversely, the number at work declined less than traffic units in contractions. Employment was more stable than traffic.

Wage-Rates and Prices

To find that the productivity of labor and fuel varied directly with traffic is equivalent to finding that labor and fuel requirements per traffic unit vary inversely with traffic. Fewer and fewer man-hours, less and less coal are required per unit as traffic expands, more and more as it contracts. If all input-to-output ratios behaved in this way, and if wage-rates and prices paid were stable, cost in dollars per units of output would fall in expansion, rise in contraction. It seems likely that input-output relations, on the whole, made for falling cost in expansion, rising cost in contraction, from 1921 to 1938. The two items we have studied, labor and fuel, accounted for roughly 70 per cent of all operating expenses except depreciation.

Actually, of course, wage-rates and prices are not stable. Prices of railway materials, supplies and fuel usually rise in expansions, tending to increase cost, and fall in contractions, tending to reduce it. Changes in wage-rates, on the other hand, have not been systematically related to cycles in traffic, at least in recent cycles. A weighted index of prices and wage-rates combined would probably indicate a rise in most expansions; it is not clear that it would show a fall in contractions.

In expansion, the physical factors in cost usually prevailed over the price factors, for unit cost (railway operating expenses divided by traffic units) showed a net decline from the trough to the peak of most traffic expansions. The most striking exception to this general rule occurred in 1918, a period of rapidly rising prices. Seasonally adjusted operating expense, excluding depreciation, fell from around 0.56 cents at the traffic trough to around 0.50 cents at the end of 1915, then rose to about 0.65 cents at the 1918 traffic peak. In contractions, there was ordinarily a net rise in unit cost.

Operating profits usually increased more rapidly than traffic when the latter was growing and diminished more rapidly when it was declining. Depreciation, taxes, and equipment and joint facility rents fluctuated less than traffic. Profits after deducting these items therefore ordinarily fluctuated by greater percentages than profits before such deductions. The fluctuations in net income after fixed charges were likewise greater, percentagewise, than the fluctuations in operating income. Dividend payments were more stable than income.

Application of one statistical procedure suggests that unit cost typically began to rise, and unit profit to fall, before the end of an expansion in traffic. It likewise suggests that cost began to fall, and profit to rise, before the end of contraction. Application of another technique to the data for the eight cycles in which we can investigate this question fails to support these suggestions. The conclusion, if any, to be drawn remains a matter of individual judgment. It is clear, however, that the most rapid fall in cost, and the most rapid rise in profit, occurred in the early stages of expansion, and that the most rapid rise in cost, and the most rapid fall in profit, occurred early in contraction.

The period covered by our study varies from topic to topic; some kinds of data go back further in time than others. The record during the four business cycles from 1921 to 1938 enables us to investigate a wide range of problems. Some of these can be dealt with, after a fashion, from 1890 onwards. We take in still earlier data on a few subjects.

Most of the work was done during the long business and traffic expansion that began in 1938. Since that phase had still to complete its course we could not include it in our tabulations. Our survey therefore ends

in 1938. In a summary way, however, the story can be brought up to date here. Freight traffic as measured by revenue ton-miles, seasonally adjusted, reached a peak in February, 1944, declined very little until the middle of 1945, then fell off abruptly. We find it hard to decide whether to place the trough in October, 1945, or May, 1946. Traffic was lowest in May and almost as low in April, but the level in these months was obviously affected very seriously by the coal strike. The curve of seasonally adjusted passenger-miles attained a high plateau in the middle of 1943, fluctuated around that level until the end of 1945, then declined severely, and was still apparently falling as late at March, 1948. Traffic diminished as the armed forces completed their homecoming and continued to dwindle as gasoline and new automobiles became more readily available.

We have yet to undertake the laborious task of bringing up-to-date our seasonal adjustment of the many operating and financial statistics employed in our study of prewar cycles. A review of annual data, however, indicates that fluctuations in traffic had many of their usual consequences. In annual terms, ton-miles, passenger-miles and traffic units were at their peak in 1944. All but passenger-miles had a trough in 1946. Passenger-miles declined further from 1946 to 1947; for our present purpose we may regard 1947 as a quasi-trough, although travel in 1948 may conceivably be even smaller.

Direct and Inverse Variations

Our analysis of prewar cycles suggests that all of the following ratios tend to vary directly with traffic: net ton-miles per loaded car-mile, per train-mile, and per train-hour; passenger-miles per passenger-carrying car-mile, train-mile, and train-hour; ratio of overtime hours to total hours worked; net operating revenue per traffic unit, operating income per traffic unit, net operating income per traffic unit. From 1938 to 1944 there was a net rise in all these ratios except operating income per traffic unit; from 1944 to 1946 (to 1947 in the case of the passenger ratios) there was a net fall in all.

Previous experience indicates that the following ratios or aggregates tend to vary inversely with traffic: average speed of freight trains, also of passenger trains; number of unserviceable cars and locomotives in freight service and in passenger service; man-hours worked per 100 traffic units; ratio of hours paid for but not worked to total hours worked; operating expenses per traffic unit, tax accruals per traffic unit, net equipment and joint facility rents per traffic unit. All of these except average speed of passenger trains and taxes per traffic unit declined in 1938-44; all except unit taxes and unit rents rose in 1944-46 (or 1944-47).

Speed of passenger trains increased only 0.1 miles per hour in the expansion, 1.3 miles per hour in the quasi-contraction; it is not really an exception to our previous findings. On the other hand, the tax situation was really new. The unusually large earnings in the middle of the cycle and the high wartime rates of tax greatly increased the importance of fluctuations in federal income and related taxes as compared with other taxes. The aggregate of all taxes, therefore, rose faster and fell faster than traffic. In earlier cycles the greater importance of the slowly changing real estate taxes usually produced the opposite result.

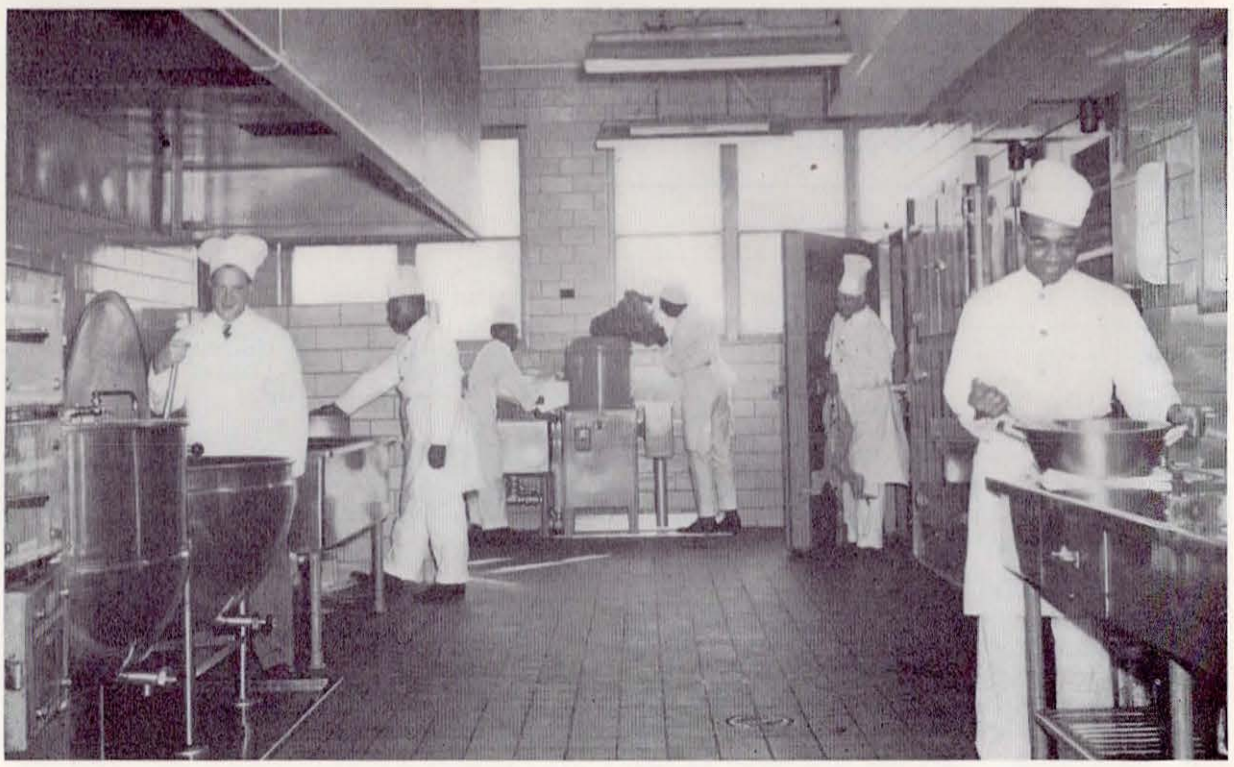
The long expansion illustrated the rule that the typical change in cost and profit ratios tends to be concentrated in the earlier stages of a phase. The ratio of man-hours worked to traffic units rose a little from 1943 to 1944; locomotive fuel consumption per ton-mile increased a trifle; and the decline in the corresponding ratio for passenger service was very slight. After 1942 operating expenses per traffic unit rose and operating profits per unit fell.

Although the data in the report do not go much beyond 1938 we close it by venturing some guarded prediction about postwar fluctuations. We do not forecast the length of future business cycles but we do offer opinions on the comparative degree to which various types of traffic and of carriers will be affected and on the fluctuations in operating and financial ratios that will accompany cycles in traffic.

In the near future we expect to publish similar analyses of transportation in western Europe. Since the statistical records there are less adequate, these reports will be briefer and less comprehensive than the volume we are now publishing.

Various members of the bureau staff are investigating cyclical disturbances in business from other points of view. The bureau plans to publish the results in a series of volumes, *Studies in Business Cycles*. One volume already published deals with the general problem and its setting, another with questions of measurement. Future monographs will be concerned with such topics as harvest cycles, banking and finance, consumer income and spending, inventories, construction and other kinds of physical investment, prices and wage rates, industrial costs and profits. A broad survey of the findings in the project as a whole is in progress.

The Fort Worth & Denver City and Missouri-Kansas-Texas share this station at Wichita Falls, Tex., an oil center which is enjoying a second boom



The service kitchen. At the extreme left is the three-section pressure cooker. Next, in order, are two soup kettles, a cooling unit, and an electric vegetable peeler. A chef is removing a turkey from the poultry refrigerator. Germicidal lamps are attached to the ceiling

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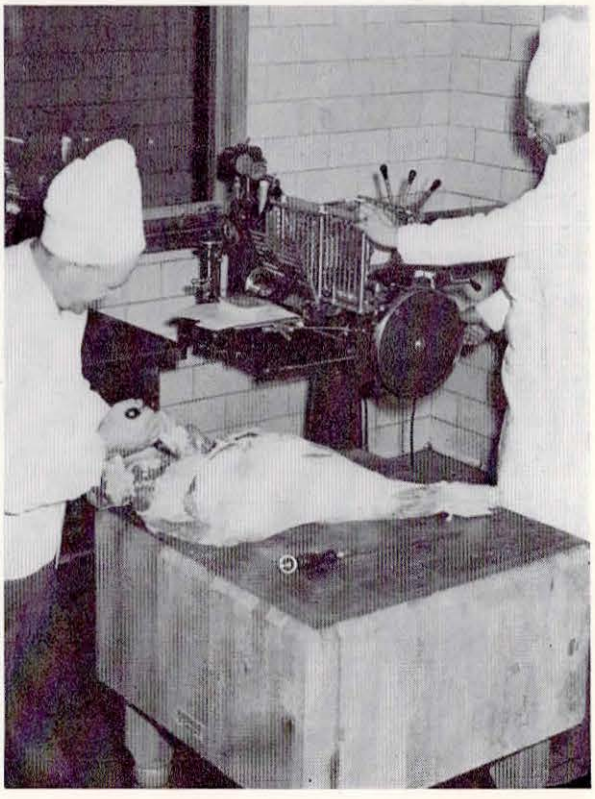

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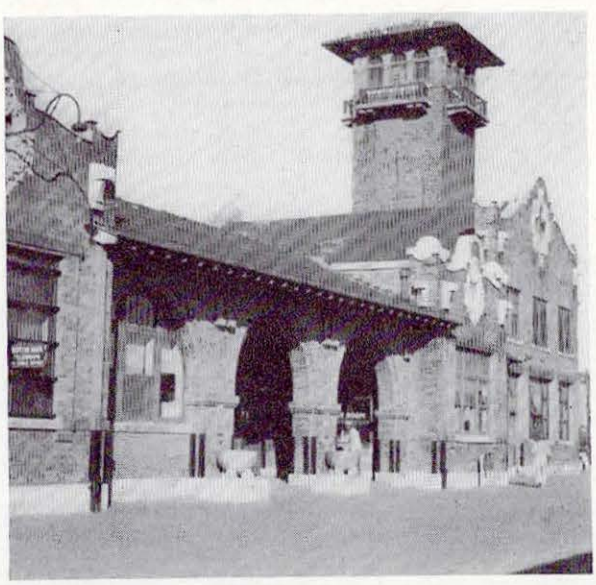


The Fort Worth & Denver City and Missouri-Kansas-Texas share this station at Wichita Falls, Tex., an oil center which is enjoying a second boom

Left—The Southern provides an office and headquarters at its Lincoln Green Demonstration Forest at Dorchester, S. C. Facing page—Scientific control includes the burning of strips along existing roads to minimize the hazard of fires

SOUTHERN'S MODEL FOREST PAYS OFF

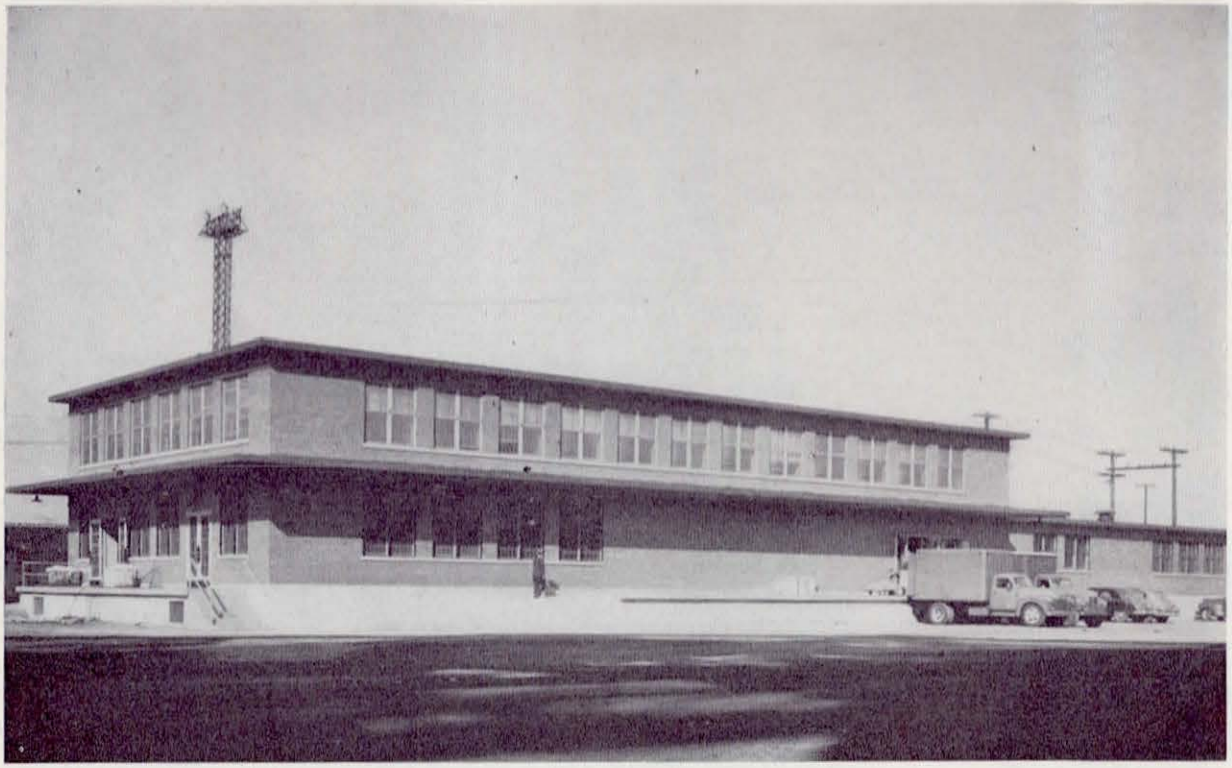
Since 1925 the Southern has operated a 14,000-acre forestry "classroom" near Dorchester, S. C. Not only has the demonstration forest—known as Lincoln Green—returned a profit to the road from the sale of timber each year since its establishment, but its industrial value now is more than twice what it was in 1925. To the railroad, however, these benefits are far overshadowed by the fact that the model forest has stimulated the interest of landowners throughout the road's territory in developing a valuable natural asset and, even more important, has attracted to the South mills and factories which must have an ample, continuing supply of timber, poles, pulp-wood and other forest products. The effect of the project on the railroad's traffic is obvious.

The Lincoln Green Demonstration Forest is located on a tract which has had a railroading connection for 118 years. It was acquired originally in 1830 to provide timber for the construction of the South Carolina Canal & Rail Road Company, a predecessor line of the Southern. Later the same area furnished fuel for the wood-burning locomotives of that era. By 1880 it had been virtually cleaned out, and when the Southern decided to convert it into a demonstration forest it was a definite liability. This put it on a par with millions of acres in the South that had been cut and burned over. Because it was so patently worthless in that state, it provided an excellent proving ground for a practical approach to reforestation.

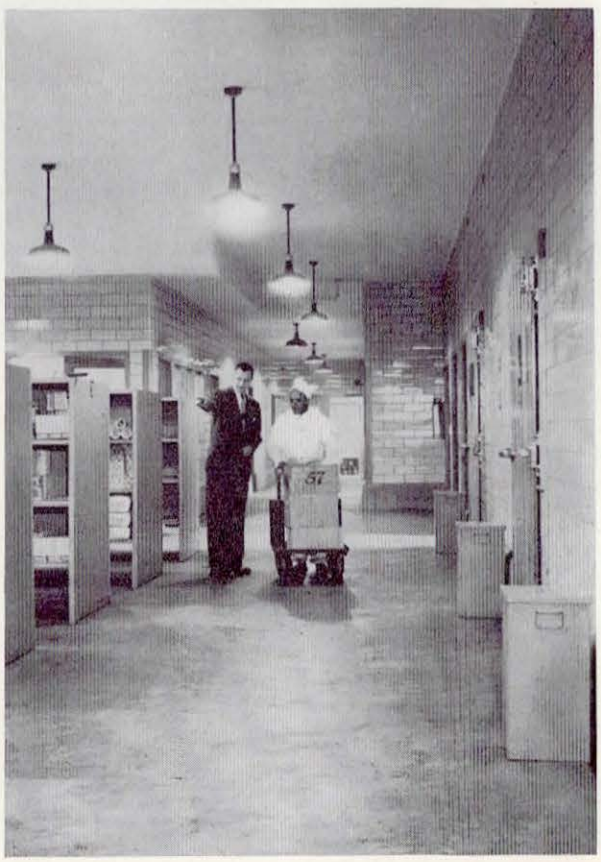
The Southern's forest is predominantly pine. Of the three species within its borders, approximately 80 per cent is longleaf. The remainder consists largely of loblolly, with some 600 acres of slash planted on old fields during the first five years (1925-1930) of the forest's development. Hardwood stands, largely in swamp areas, have not been cut recently and account for little of the total available stumpage. Since the forest has been on a "pay as it goes" basis consistently, the demonstration area has of necessity extended gradually. Approximately 40 per cent of the total area is now in the demonstration phase.

Not only does the forest stimulate landowners' interest in the proper planting, cutting and fire protection of their woodlands, but it also serves as a giant outdoor laboratory for foresters, forestry students and others. Typical of their reactions is that of an associate professor of silviculture who, after a tour of the forest, declared, "Methods of fire control, reseeding and replanting worked out by the Southern's forestry experts are the proper solution to bring about more reproduction of the valuable longleaf pine."

The 23-year-old demonstration forest has greatly stimulated the movement of pulpwood on the Southern's lines



Highway trucks make deliveries to a covered platform on the east side of the Pennsylvania's new commissary. Laundry pick-ups and deliveries are made at the platform on the south end



MODERN COMMISSARY ENHANCES DINING CAR EFFICIENCY

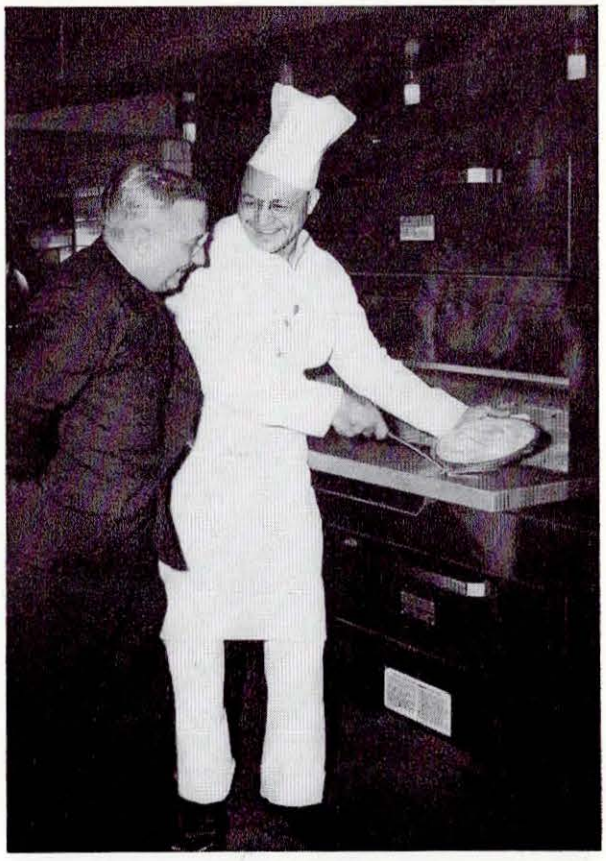
Early in November the Pennsylvania placed in service a completely new two-story dining car commissary at Chicago. The new structure—built at a cost of $580,000—provides the most modern and efficient equipment available for the receipt, storage, processing and dispensing of dining car supplies. It includes new offices which, together with the kitchen and butcher shop, are air-conditioned. By centralization of much of the food preparation in the commissary kitchen and butcher shop, important economies in the utilization of food and the reclamation of waste cuts have been made possible. Work heretofore performed on the dining cars while en route has been reduced considerably by preparatory steps taken at the commissary, employing mechanical methods whenever possible. Kitchen equipment which could scarcely be justified on each of the 20-odd diners dispatched from Chicago daily "earns its salt" over and over again in the commissary kitchen.

The new building is brick, steel and concrete. The first floor and the basement measure approximately 200 ft. by 58 ft. The second floor, which contains the offices, stationery storeroom, filing space, crew facilities, and an air-conditioned conference room, measures 120 ft. by 58 ft. A pneumatic tube transmits communications between the storekeeper's office on the first floor and the general offices on the second.

Located at the south end of the road's Twelfth Street coach yard, the new facilities are within easy reach of the diners, which are made up in trains on nearby tracks. A six-ft. canopied platform serving a driveway for public vehicles is located along the east side of the building. A platform on the south end serves laundry trucks picking up soiled linen from the sorting room and delivering clean linen to the storage, sewing and issue rooms. A high-level platform and a parallel low-level driveway for tractor-drawn, four-wheel trucks and a railroad siding, flank the west side of the building. Supplies and provisions issued for the dining cars are loaded from this platform to the four-wheel trucks and are towed over a system of concrete driveways to the dining cars in the adjacent coach yard. Supplies received from highway trucks on the east side of the building are handled by hand trucks to the point where they are required on the same floor, or by an elevator to dry-storage or deep-freeze space in the basement. Supplies received by rail are conveyed to the basement by a gravity chute.

Sanitary Features

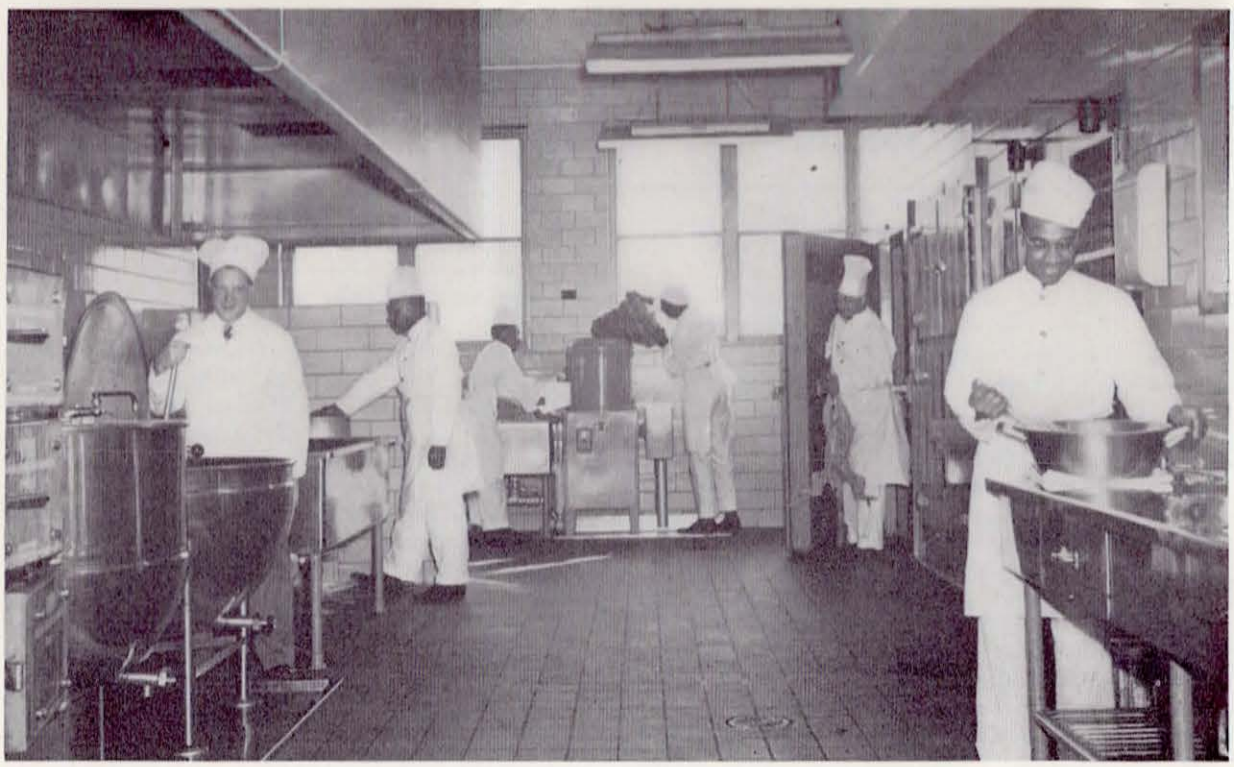
The interior of the building resembles a modern hospital in its sanitary provisions, complying in every



Facing page (left) — At the west side of the commissary, supplies issued to car crews are loaded on tractor-trailer trains for transfer to the diners

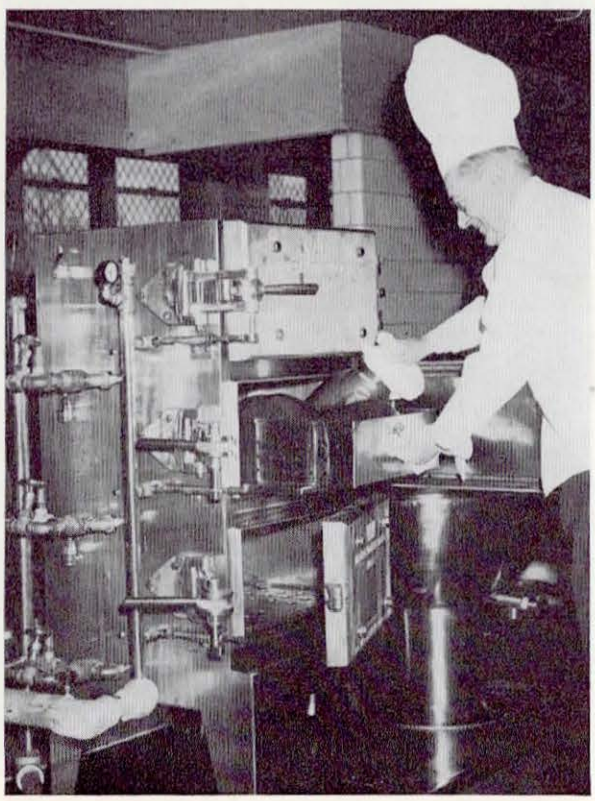
Facing page (right) — The doors to the six room-size refrigerators for the storage of meat, poultry, fish and dairy products are shown at the right of the first-floor main corridor. Bins on the left contain dry or canned foodstuffs

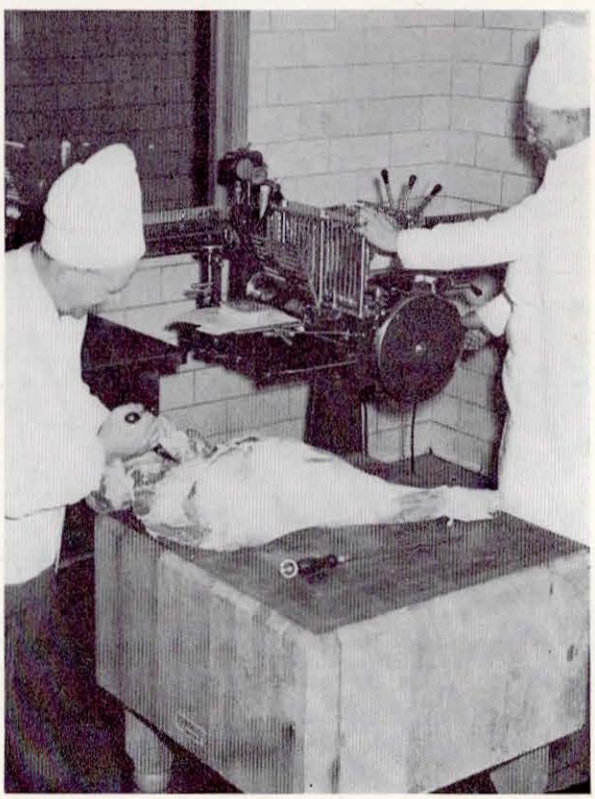
J. P. Fehr, assistant superintendent of dining car service, watches Chef Vernon Redd remove a freshly-baked pie from the three-section electric oven



The service kitchen. At the extreme left is the three-section pressure cooker. Next, in order, are two soup kettles, a cooling unit, and an electric vegetable peeler. A chef is removing a turkey from the poultry refrigerator. Germicidal lamps are attached to the ceiling

Left — Ernest H. Engelke, supervising instructor, prepares three hams simultaneously in one of the compartments of the steam pressure cooker. Right — The butcher shop includes an electric meat slicer. Instructions for cutting steaks are: "not less than one inch thick"





respect with the rigid requirements of the U. S. Public Health Service. Walls in the kitchen, butcher shop, six room-size refrigerators and basement deep-freeze are of glazed white tile. The floors are tile or concrete. The ceilings are plastered. Sinks, basins, and adjoining work spaces are of stainless steel. Pastry mixing areas are of marble. Germicidal ceiling lamps are installed in the kitchen, butcher shop and the six large refrigerators. Electrically operated "fly eliminators"—installed and maintained by an agent of the manufacturer—are distributed throughout the food-handling areas. Facilities for dining car crews on the second floor include shower baths and individual lockers.

The kitchen and butcher shop also provide a base for training dining car personnel in the preparation and conservation of food, service methods, sanitation, and the economics of food handling, and are used further in presenting refresher courses for experienced personnel.

Partial List of Equipment in the Pennsylvania's New Dining Car Commissary

Air conditioning	Worthington Pump & Machinery Corp., Holyoke, Mass.
Bowl rack and cooling racks	Union Steel Products Co., Albion, Mich.
Mixing machine	Read Machinery Division, Standard Stoker Co., York, Pa.
Scales	Toledo Scale Co., Toledo, Ohio
Vegetable peeler	Anstice Co., Rochester, N.Y.
Vegetable cutter	John E. Smith's Sons Co., Buffalo, N.Y.
Liquor vault	Mosler Safe Co., Chicago
Electric ranges and electric bake oven	Hot Point, Inc., Chicago
Thermotainer	Franklin Products Co., Chicago
Pressure cooker	John Van Range Co., Cincinnati, Ohio
Steam kettles	Groen Manufacturing Co., Chicago
Can rinser and sterilizer	Cherry Burrell Corp., Little Falls, N.Y.
Slicing machine	U.S. Slicing Machine Co., LaPorte, Ind.
Fly eliminators	American Aerovap, Inc., New York
Germicidal lamps	Tru-Air Ultraviolet Products Co., Los Angeles, Cal.
Electric meat, fish and bone saw	Biro Manufacturing Co., Marblehead, Ohio
Refrigerator doors	Butcher Boy Cold Storage Door Co., Chicago
Elevator	Haughton Elevator Co., Chicago

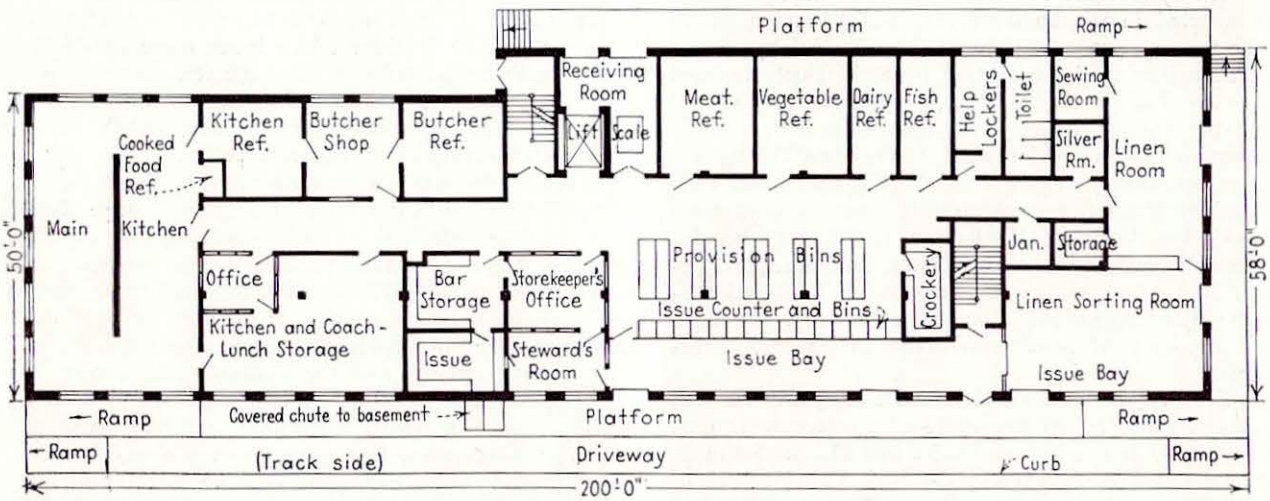
Kitchen Gadgets

To improve, expedite, and reduce the cost of serving dining cars, commissary forces—in their all-electric kitchen—prepare mixed dishes, such as stews, soups and soup stock, prior to the departure of the cars. These items are transferred to the cars, along with the other foodstuffs and supplies, in sealed, insulated containers. Some meat cuts which lend themselves to pre-cooking—such as hams—are prepared in advance for regular runs. For group movements, particularly military movements, where the menus are set in advance and the number of servings is known, entire meals may be prepared in a few hours' time and loaded aboard the cars just before departure.

Kitchen equipment includes electric roasting and baking ovens, vegetable peelers, 4-speed dough mixers, food choppers and meat grinders. A high-capacity 3-section pressure cooker permits rapid preparation of cooked foods without sacrifice of taste or quality. There is an electric potato peeler which will handle 100 lb. in six minutes, saving hours of hand peeling aboard the car kitchens. An automatic pot washer does that chore more thoroughly in considerably less time than is possible by manual methods.

As the accompanying plan of the ground floor indicates, the layout is so arranged that material moves from receipt to point of issuance with minimum handling or cross-hauling. Separate issue rooms for bar supplies, foodstuffs, linens and car supplies are located progressively along the platform, where crews stock up for outgoing runs.

The new commissary was designed by Naess & Murphy, Chicago, under the direction of the Pennsylvania's dining car department, and was constructed by Charles B. Johnson & Son, Chicago. The new building replaces one built in 1927, at which time only 63 dining cars were dispatched weekly, compared with a present weekly total of nearly 150 diners and railroad-operated lounge-buffet cars.



Plan of the first floor illustrates the efficient arrangement of facilities for receipt, preparation and issuance of dining car supplies. Most of the storage space, including a deep-freeze and a liquor vault, is in the basement

The modern elevator at Port Tampa handles phosphate rock at a rate of more than 1,000 tons an hour

FERTILIZER FOR THE WORLD

Special operating procedure protects maximum phosphate production on Atlantic Coast Line

Some 80 per cent of the world's phosphate rock is mined in Florida—the principal mining activity being conducted in the Land Pebble district—and much of the tonnage produced is handled by the Atlantic Coast Line under special operating methods. Such methods are required by the fact that, despite vigorous efforts by the mining industry and the expenditure of vast sums to improve and expand its facilities, the market has expanded so rapidly that highly specialized railroad transportation is required to maintain production levels and accelerate distribution. If railroad schedules are disrupted as much as an hour, the consequent delay in spotting empty cars may result in forced suspension of operations of the mine involved, causing a costly delay of about two hours in getting started again.

The Florida Land Pebble district comprises an area some 30 mi. by 60 mi. in extent, centering around Mulberry, 32 mi. east of Tampa and 11 mi. southwest of Lakeland. It is served by the Bone Valley branch of the Atlantic Coast Line's Tampa district. For some eight months of the year this district is extremely busy handling perishables which it originates. A superintendent is in charge of the district, while the Bone Valley branch itself comes under the immediate supervision of a superintendent of mine service, with headquarters at Mulberry. The latter office functions in a dual transportation-traffic capacity, reporting to the superintendent on operating matters and to the vice-president in charge of traffic, at Wilmington, N. C., on matters involving traffic and policy.

Much of the phosphate rock handled by the A. C. L. is transferred to water craft at its Port Tampa Terminals, from which it flows in coastwise and export service. Here, too, a highly specialized operation is carried out under guidance of a terminal superintendent. Both the superintendent of mine service and the superintendent of terminals maintain separate staffs, cooperating closely, and are charged primarily with supervision and handling of this important tonnage.

The phosphate matrix underlies overburden ranging in depth from a few feet up to 40 ft. The overburden is removed by electric-propelled draglines, including the giant "Bigger Digger," weighing more than 2,570,000 lb., and equipped with a 215-ft. boom and scoop which picks up about 32 tons at a single grab.

After removal of the overburden, the phosphate matrix is partially broken up with the draglines and forced by hydraulic pressure to pit sumps, from which it is pumped to nearby washing plants. At the washers, pebble rock is separated from clay, sand and other worthless material, following which the washer affluent is conveyed to adjacent recovery or reclamation plants. After necessary chemical and mechanical treatment, fine, high-grade particles of rock are recovered. The rock is then collected in overhead storage bins, from which it flows by gravity into specially designed open-top railroad dump cars spotted on underlying tracks.

The railroad transports the wet phosphate rock at low transit rates to drying plants with hauls ranging from 5 to 31 mi. There is also a commercial movement direct from the washers to certain South Florida super-phosphate and chemical plants. A fleet of 1,080 open-top dump cars is assigned to this wet rock service.

Following arrival at storage yards adjacent to the drying plants, the wet rock is unloaded by gravity from overhead trestles and is fed from open storage through chutes to conveyor belts operating underground and taken to rotary oil-fixed kilns. From the kilns it is again belt conveyed to dry storage bins and subsequently handled by gravity from bin storage into railroad cars. Phosphate for water movement is dumped into covered hoppers for transportation to Port Tampa. Some 800 specially built cars shuttle between the driers and Port Tampa in this service. For interior movement all-rail to fertilizer and chemical plants all over the United States, the phosphate is usually loaded in box cars, although the covered hoppers normally used in port service may be utilized at slack periods. The A. C. L. is currently augmenting its fleet of covered hoppers by 100 additional new 70-ton cars. So far as possible it is standardizing on 50-ton capacity cars for the wet rock movement and 70-ton cars for the port movement.

The mines, washers and driers are situated on two roughly paralleling railroad lines and on numerous spurs extending therefrom. The main or feeder line is the Bone Valley branch, extending from the Jacksonville-Tampa line at Winston south to Fort Meade, 28.8 mi. Curiously enough, in this territory where so much of the world's fertilizer material is mined, there is little or no farming, so that, except for several small distributing warehouses, oil storage plants, etc., operations of the Bone Valley branch are almost exclusively concerned with the handling of phosphate rock trains and the movement of inbound materials and supplies.

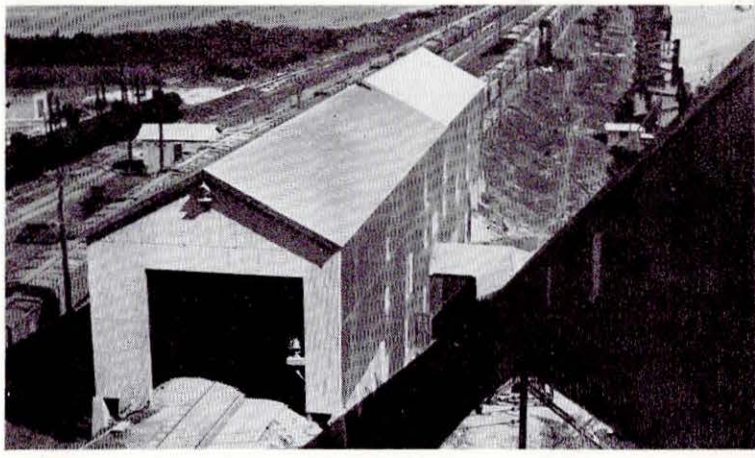
The second line serving mining operations is the branch from Lakeland, on the Jacksonville-Tampa main line, to Fort Meade, 24 mi. The Lakeland-Fort Meade line, however, is in a perishable-loading territory and is part of the line to Fort Myers, so that it has daily freight and passenger service not concerned with the phosphate rock movement.

Local Dispatchers Control Flow

In the originating territory, the phosphate movement is almost entirely on a train-load basis (3,500 to 4,000 tons of rock per train) involving between 14 and 18 trains a day. To handle this movement a separate set of dispatchers is maintained on a 24-hr. basis at Mulberry. These men work closely with, and under, the chief dispatcher of the Tampa district at Tampa, but report to the superintendent of mine service at Mulberry. An important duty is to keep a sufficient supply of the three different types of cars used in the several movements on hand at all times.

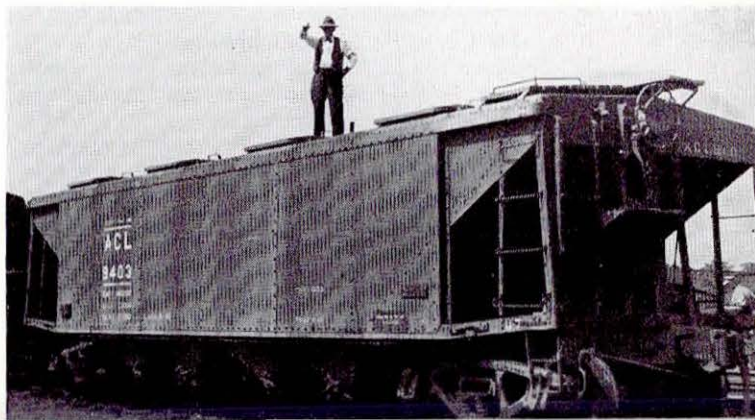
The layout of the tracks, as shown on the map, is in the form of a rough parallelogram, a fact made use of by the dispatchers. Ordinarily, the wet rock movement from washers to driers is over the same route as the movement of dry rock *from* the driers. If, however, this route is congested or otherwise impaired, alternative handlings is possible. For example, a large washer is located at Peace Valley, on the Lakeland line just north of Fort Meade. The rock is dried at a drying plant at Prairie, a few miles from Mulberry, and the trains of wet rock normally move via Fort Meade, thence north to Prairie. In emergencies, however, the trains are rerouted via Bartow, Lakeland and Winston, thence south to Prairie.

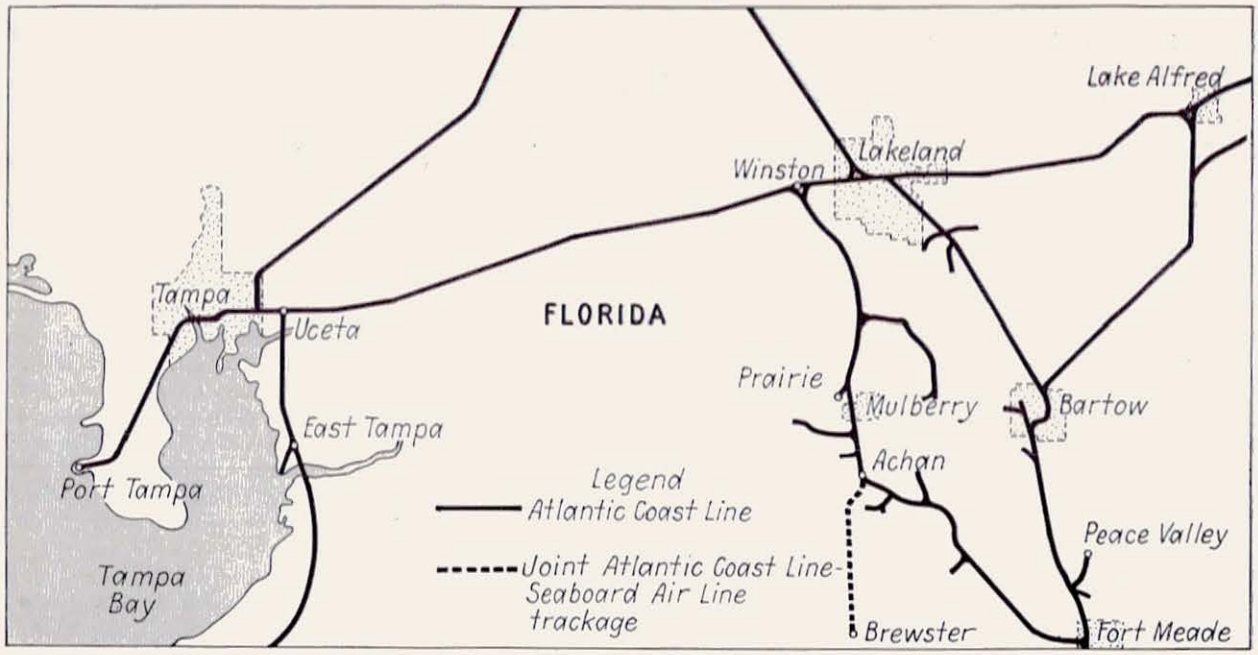
The dry rock trains for interior destinations are sent from the drying plants into both Lakeland and Uceta yards, the latter being the main yard for the Tampa area, situated 3.2 mi. east of Tampa. From these points they move north via the west coast route of the Coast Line. On infrequent occasions, when, in the heavy perishable shipping season, yards on this route threaten to become congested, some trains of rock are



At Port Tampa an electric car puller brings the phosphate cars into a drop shed for unloading

Seventy-ton covered hopper car assigned to phosphate rock service





Some 80 per cent of the world's phosphate rock is mined in Florida, much of it on two branches of the Atlantic Coast Line

sent out of Lakeland to Jacksonville to forestall such a condition. Despite the fact that the rock is moved over a railroad specializing in high-speed perishable schedules, it is by no means regarded as drag freight and moves north on fast schedules.

Transshipping at Tampa

Phosphate moving in coastwise and export trade is transferred from car to ship at the Coast Line's docks and elevators at Port Tampa, 10 mi. southwest of Tampa. An average of 1,500 cars of rock are handled per month, the record tonnage for any month having been 154,265 gross tons. During 1947 the average transfer was 98,980 gross tons monthly.

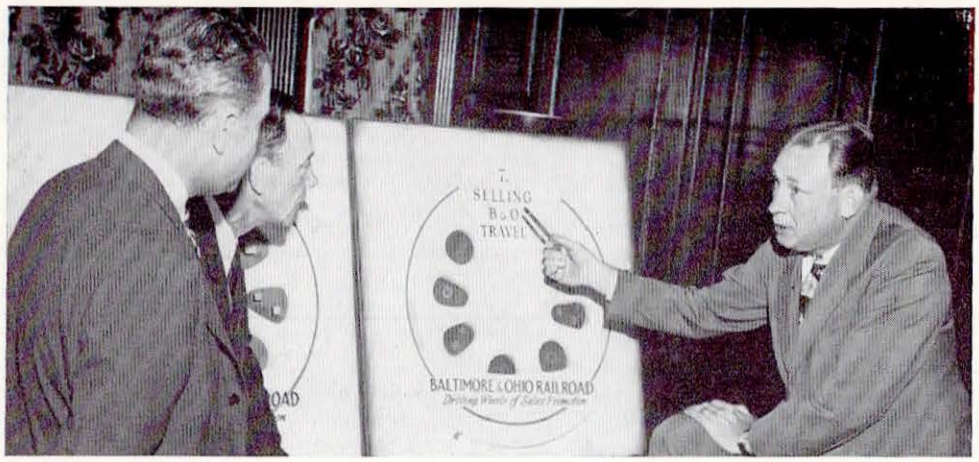
The Port Tampa terminal is operated as a separate terminal division, which includes the port facilities and 4.7 mi. of line connecting the terminal with other portions of Tampa district. As the superintendent at Port Tampa receives notice of the impending arrival of ships, he notifies the superintendent of mine service at Mulberry and the placement of empties at mine loading bins is arranged, with subsequent dispatch from the mines to Uceta yard. From Uceta, the trains are handled to Port Tampa by turn-around crews, filling out with any empty tank cars or other traffic on hand. The empty phosphate cars are brought back to Uceta in trains with loaded tank cars. Under ordinary conditions, cars assigned to the phosphate rock service are returned empty within 48 hr.

Upon arrival at Port Tampa yard, the cars are first weighed by being pushed over an automatic track scale, then pulled by an electric car puller into the "drop shed," where the unloading of three cars takes place simultaneously. After unloading, they are dropped down a gravity tail track through a spring switch and onto a "kick-back," which supplies sufficient impetus to drop them back into the empty yards by gravity for making up into return trains.

The rock is unloaded from the hopper-bottom cars into a drop pit, from which it moves on a transverse belt conveyor to an incline belt conveyor, and finally, to a horizontal conveyor which runs the entire length of an elevator at a height of 70 ft. above the ground level. This arrangement provides an uninterrupted flow from the railroad car into the hold of the ship. Movable spouts operating on a monorail between the elevator and the ship permit loading of the vessel without the necessity of shifting or disturbing it. The rock-loading elevator has a rating of 1,200 long tons an hour and the consistent average is over 1,100 tons an hour. The elevator is the conveyor type with 48-in. belts. The facilities will accommodate vessels up to 10,400 tons capacity, the average for export trade being about 7,000 tons. Loading and trimming of a 7,000-ton ship requires about 8 hr. When necessary, operations are placed on a 24-hr.-a-day basis. While only one vessel can be loaded at the elevator at a time, as many as five vessels can be berthed in the outer canal and three or four additional ships at the head of the canal.

The port has complete stevedoring and lighterage facilities, including a powerful steam tug. A recent innovation is the use of a bulldozer in the hold of ships to flat trim the rock so that top cargo may be loaded at other ports. The former manual trimming was a long and tedious job.

The transportation of phosphate rock is a very specialized undertaking. To handle it properly and quickly the A. C. L. has set up the unique organization described. The operations work smoothly and efficiently, a result in large part of the separate operating staffs which are concerned principally and almost solely with this specialized job.



W. E. Meuse, general passenger agent, makes his point on one of the visual aid charts used in B. & O. sales training sessions

BUILDING SALESMANSHIP IN THE PASSENGER DEPARTMENT

By JOHN F. WHITTINGTON
General Passenger Traffic Manager, Baltimore & Ohio

World War II, although it demanded every ounce of our energy as operating men, gave us the opportunity to take stock of our efforts to "manufacture customers" during the previous decade. Our passenger department studied its past efforts to make sure we were not in a groove—and the difference between a *groove* and a *grave* is only a matter of depth.

Our salesmen, in our minds, were as good as any in the field. But we felt that in the competitive "battle of transportation" which would follow World War II, we were not good enough. For, what we had come to know about selling was, almost entirely, a result of our practical experiences on the firing line.

We thought it might prove helpful to us to study the selling tactics of salesmen in industry in general, for industry, as a rule, trains its salesmen in some manner or other. How do they do it? What methods do they use? Are they worthwhile? Do they bring results? Can they be applied successfully to selling railroad passenger transportation?

So it was decided that Baltimore & Ohio salesmen should know these things. Now, nearly every executive has had his share of experiences with the sort of confessed experts who volunteer, for a fat fee, to tell salesmen all about "presentations" and "approaches" and "buying motives" and such things, but who can't sell for sour apples. We wanted no "high-pressure" stuff. We wanted the actual, the factual, the common sense, down-to-earth practical technique that would, we hoped, fit us for the postwar battle for the great American transportation dollar.

In our department we happened to have a young officer, who, in addition to having served as a sales manager in industry, had some experience in his early career as a newspaper reporter. Here, we felt, was a man sufficiently equipped to send out into the various fields of American industry, a man trained to find the true story from a sales standpoint, and one qualified to act as our reporter.

For one year, our reporter, accompanied and assisted generally by a member of our advertising agency, did little else but go, look, and listen. First off, he sat around the conference table with groups of our own representatives all over the system. During these meetings our representatives themselves did two important things. They donated a considerable amount of practical material which became part of our training program, and they spoke of things they felt they lacked and the railroad needed.

A Year in the Field

The next step was to go outside our own field to see what American industry was doing to train its sales force. We wanted to make sure we knew all the tricks to the selling trade. Calls were made upon industrial sales managers; calls were made with their salesmen; sales meetings were attended. Our reporter read sales training programs, sales books and saw sales movies. All the while he listened, and asked questions. From a mighty mass of material gathered from many sources, we accepted only those features

How the Baltimore & Ohio searched the entire field of industrial and business merchandising and applied its findings to the sale of railroad passenger travel was told as part of an address by that road's top passenger officer before the American Association of Passenger Traffic Officers at Estes Park, Col., last autumn. *Railway Age* has the author's permission to print portions of the talk as long as it emphasizes that the Baltimore & Ohio's technique is only an example of the alert and alive methods of American railroads.

which would be practical and effective in merchandising passenger traffic and, adding our own valuable training from experience, wove them into a program labelled "sales promotion sessions."

Because successful selling is, in itself, "dramatizing," the sales promotion sessions had to be treated in the same manner. Hence the sessions became not "staff meetings" but, in fact, "productions." Specific, detailed instructions were issued in advance to each regional officer, describing the type of meeting room required, the furniture, the equipment, the seating arrangement, and the "staging"—even including a spotlight!

The lecture, discussion and visual material, once gathered together, molded itself into two distinct parts; namely, the fundamental principles of selling—no matter whether you are selling Wheaties, life insurance or transportation—and, in the second part, the actual application of such principles to the sale of B. & O. travel in particular and railroad travel in general.

A main feature of the "production" was a display featuring two "locomotive wheels," so arranged that each subject discussed could be emphasized by the spotlight. In addition, charts, diagrams and displays were used, and a sound motion picture dramatized the art of selling.

All of the session material, together with reproductions of all charts and diagrams, were prepared in book form and each salesman given a copy at the end of each session. To unite the salesmen into a closer-knit, more effective unit, it was decided to publish at regular intervals the salesman's own newspaper, called "The Sales Promotor," the first issue of which was used as a sample at each session.

So our reporter found out what industry was doing to train its salesmen—and his staged production was given not as a teacher, but as a reporter fulfilling his assignment. It is felt that, aside from the valuable basic training provided—and the added self-confidence which is always the result of added knowledge—two important contributions were made to the sales force.

The Basic B. & O. Story

The first we call "The Basic B. & O. Story." Generally speaking, in promoting a man from the ranks to the sales force, did we ever tell him how to sell his railroad? Did we ever tell him what to say? Do you think that Travelers' Insurance, for instance, sends its representatives out without telling them "This is Travelers' Insurance, and this is how you sell it?" So, to fill this need, we provided our sales force with a basic sales story—a chronological, effective, dramatic sales story to be used by our representatives in selling, and sufficiently flexible to be used under any and all conditions.

But the second important donation to our sales efforts was distinctly unusual—distinctly revolutionary in our business and of far-reaching importance. Would you be surprised if I told you that there are *six*—and only *six*—basic objections to traveling on the B. & O., or any other railroad? At every session we offered a substantial reward to anyone who could find a seventh; we never paid our reward. This, then, was indeed something new. If our salesman could be forewarned of these six possible objections, if he could have in his mental equipment replies or answers to them, he could still keep his foot in the door instead of "folding" and making a retreat.

Six Basic Objections to Travel By Any Railroad—if a passenger salesman can deal with these, he has *nothing* more to fear:

(1) "It costs too much."
(2) "My friends don't travel on your line."
(3) "I've already made my plans."
(4) "I **always** travel some other way."
(5) "I, or a friend, have had a bad experience on your railroad."
(6) "Some other line (or mode of transport) gives better service."

Of course, the proof of the pudding is in the eating. What results were and are being attained? Were any goals reached? Our men were never poor shots at any time, but we feel more and more that we have a battalion of real salesmen on the firing line right now. In addition, there is a much higher morale, for our men realize that management is interested in their efforts, interested in all phases of their daily work.

Shortly after the sessions we began to see the results. Our men were making more calls, getting the business, selling better. Sales training hasn't stopped there. It is, and must be, an ever-continuing program. To "anchor" the sales training, and to insure its daily application, training sessions for supervising officers were held, for the forgotten segment of sales training is *sales supervision*. We feel that our study taught us much about proper supervision and instructing supervisors. Equally important, the responsibility of carrying on the sales training locally was placed squarely upon the shoulders of supervisors.

Much remains to be done. We must carry our training into our ticket offices, information bureaus—to all who deal with the public. Such a program is in preparation. In connection with it, I would like to discover how to remove the obstacles many of us encounter in daring to trespass into the realm of other departments. And trespassing is necessary if we are to get into railroad station ticket offices.

I am convinced we must examine all of our operations. Let's take just one, for example. Thousands of travelers buy tickets on our railroads, use only a portion of such tickets, and send the unused coupons to us for redemption. They want their money back. Many times they do not tell us why they did not finish the journey. Do we ever ask them? Do we ever ask if they had received courteous treatment? Do we ever tell them we are sorry they couldn't complete the ride on our railroad? Do we ever do any selling, any public relations, in connection with refunds? We are now trying to do more of this on our railroad.

Because of the complexity of our business, I fully realize our limitations, but I still insist that we are overlooking selling and public relations bets in the manner in which we conduct some of our business. And, in this day of stern competition, any transportation agency that hopes to get away from the post with the rest of the horses had better not overlook many of those bets.

NEW AND IMPROVED PRODUCTS OF THE MANUFACTURERS

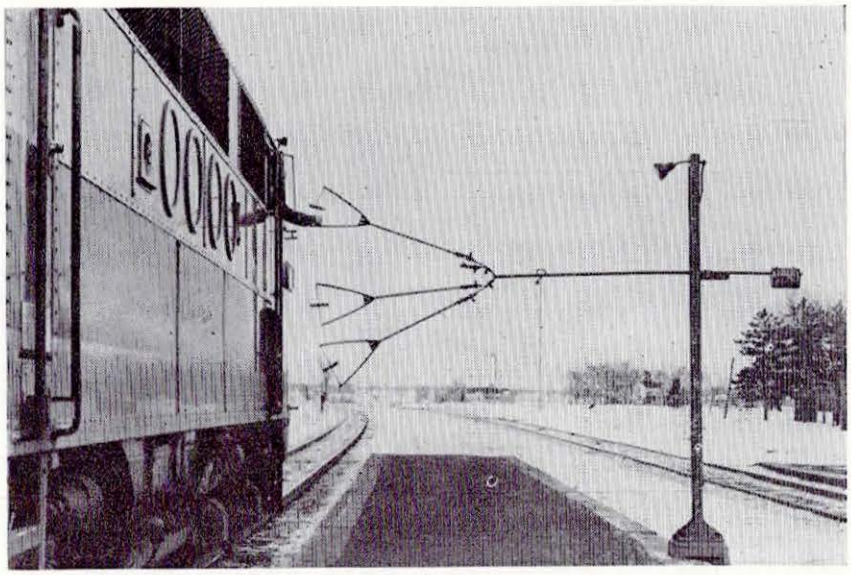
TRAIN-ORDER STAND

Fairmont Railway Motors, Inc., Fairmont, Minn., is now offering a stand designed to hold train orders in position for delivery to train crews. It is claimed that the use of the stand for this purpose promotes safety, because the need for manual handling by the station operator is eliminated, and enhances the ease and certainty of delivery at high train speeds, because the orders are held in a steady fixed position.

The unit consists of a movable steel arm, pivoted-mounted on a steel column. The column, when installed, is located far enough from the track to permit unrestricted use of the station platform. In the non-operating position the arm hangs downward between the two members that form the column, and can be padlocked in this position. When in the operating position the arm projects outward horizontally from the column toward the track at a height above the station platform sufficient for ample clearance of pedestrians or trucks. It is fixed in this position by an adjustable counterweight.

The end of the arm adjacent to the track is equipped with four spring-tension sockets into any of which can be fitted a standard Y-type train-order hoop. If all four hoops are in place at one time, their Y ends are spread out in a vertical plane in a fan-like arrangement in such a way that each train order is held at a different height above the ground.

Provision has been made in the train-order stand to simplify the installation of lights, if desired, for floodlighting the orders during night delivery. The stand as furnished is complete except for order hoops, mounting foundation and lights.



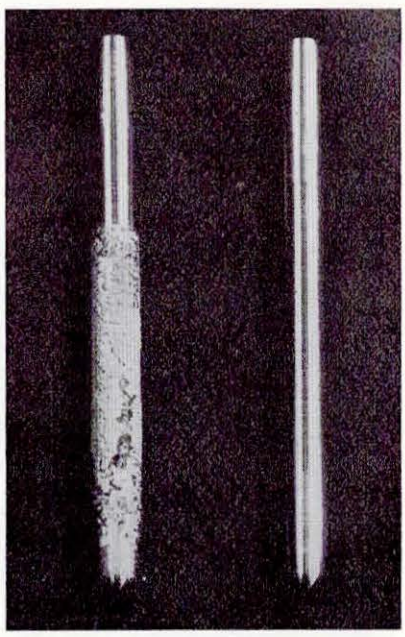
The Fairmont train-order stand

FUEL-OIL ADDITIVE TO PREVENT RUSTING

A means of preventing rust and corrosion has been found in a rust-preventing compound developed by research scientists of the Sinclair Refining Company. Known as RD-119, the newly discovered fluid is now being added to all Sinclair petroleum products as they flow through pipelines to distribution points. Under this process, all of the company's products, such as gasoline, kerosene, heating oil and Diesel oil will contain an effective portion of the rust inhibitor. The additive preserves the efficiency of petroleum products with which it is mixed.

The use of petroleum products containing RD-119 is said to avert expensive engine stoppages and repairs caused by clogging of gasoline fuel lines and carburetors from rust and scale formed by moisture condensation in automobile gasoline tanks. Similar conditions will be corrected on all types of engines utilizing as fuel gasoline, kerosene and Diesel oil. Household and industrial oil-burning furnaces will also be free of clogged fuel lines and spray nozzles by using fuel oil containing RD-119. The efficiency of RD-119 in eliminating rust and scale on metal surfaces is such that only a little more than 2½ gal. are required to give rust-preventing qualities to 42,000 gal. of petroleum products.

RD-119 provides an invisible polymolecular protective layer, which prevents the metal surfaces from coming in contact with air and moisture, thus preventing rust and corrosion of such metals as steel, zinc, aluminum and



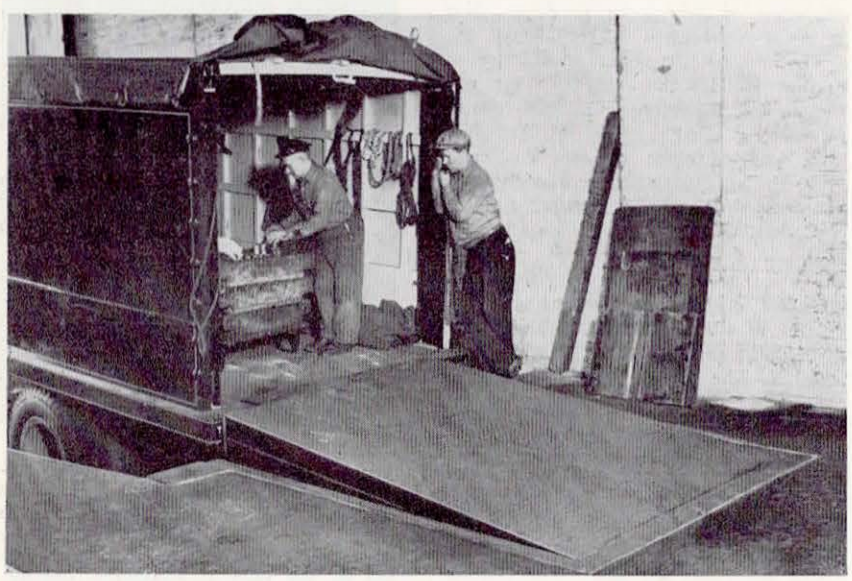
Test results by the Sinclair Refining Company showing protection obtainable from use of RD-119 — The steel bar on the left shows a heavy deposit of rust after immersion in ordinary kerosene while the bar on the right is completely rust-free after immersion for the same length of time in kerosene containing .007 volume per cent of RD-119

brass. The additive will render rust- and corrosion-proof storage tanks, tank cars, tank trucks, ocean-going tankers and pipelines. The producer claims that, because of its inhibiting characteristics, the incorporation in the fuel of RD-119 will reduce substantially the maintenance costs of Diesel locomotives and buses, and other Diesel-powered vehicles as well as industrial machinery using heavy oil for power and heat.

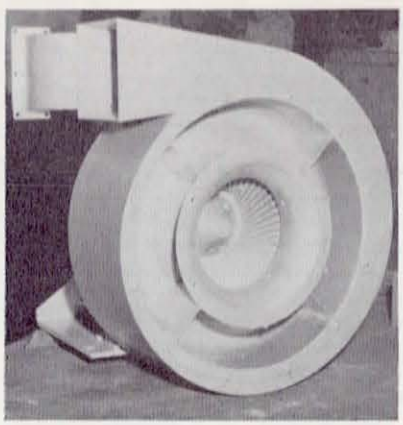
Patent applications covering the development of RD-119 have been filed, but license agreements will soon be available making RD-119 obtainable for use by other firms.

POWER RAMP TO SPEED MATERIAL HANDLING

A hydraulic loading ramp which may be installed in present docks or incorporated in new loading platforms has been designed by the Superior Railway Products Corporation, Pittsburgh, Pa. The ramp is constructed with a rolled-steel safety-tread floor plate with a frame of standard channels. Two high-pressure rams, a pump, a motor and a control valve are employed for raising and lowering the ramp to the varying levels of truck floors above or below normal dock level. A method for fixing the run-off end of the ramp at any desired level is provided by locating stops positioned on the sidewalls at the front of the pit. Up to four ramps can be operated from one pump and one motor with only a motor push button and control valve for each ramp. Standard Superior ramps are built to handle loads of five tons, with a safety factor allowing for off-balance loads. However, installations can be designed to carry loads of greater weight.



The Superior power ramp lifts to as much as 18 in. above, or lowers 9 in. below, normal platform level



Roto-Clone dust precipitator for passenger car application

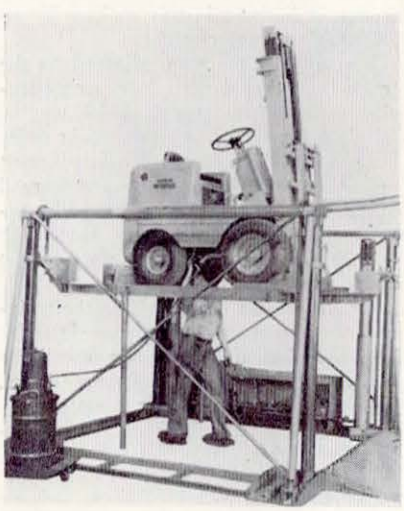
DUST PRECIPITATOR FOR PASSENGER CARS

A dynamic dust precipitator designed specifically for passenger car application is being made by the American Air Filter Company, Louisville, Ky. The unit, called the Roto-Clone, is driven by a ½-hp. motor, and serves to supply air to the car, and to separate all the larger size dust particles from the air. It is intended for use in combination with this company's Electro-Airmat electronic filter which removes small particles including smoke.

The dirt-laden air is drawn in at the appliance's central opening. As the air passes through the impeller, it is divided into numerous thin streams. The dust particles contained in these individual streams are precipitated on the blade surfaces and concentrated by centrifugal and dynamic forces. When they reach the outer edge, they are ejected into a secondary air passage (which may be seen in the illustration) at one side of the clean air outlet.

HYDRAULIC LIFT FOR TRUCK MAINTENANCE

An electric-hydraulic lifter for servicing fork-lift trucks, industrial trailers and platform trucks has been developed by the Service Caster & Truck Corp., Albion, Mich. Designed to elevate such equipment to desired heights for lubrication, inspection and servicing, the lifts are available in 6,000-lb. and 12,000-lb. capacities. Safety devices include hooks which lock into the legs at any point in the platform's rise, and safety pipes which drop from the platform to the floor once the proper height is attained. "Dead-man" control is also pro-



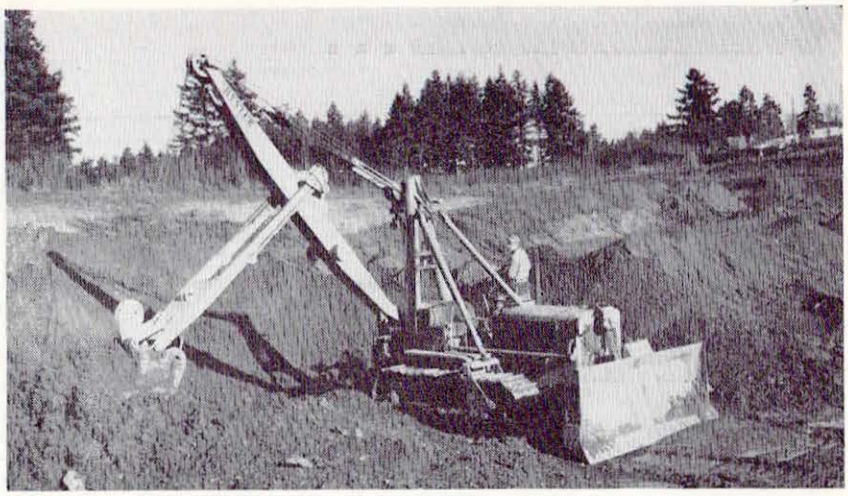
Service lift raised and locked in position for the inspection and lubrication of a fork-lift truck

vided. Other features of the lift are its open platform, permitting complete accessibility for lubrication and maintenance work; a method of chocking truck wheels; and a special support block on which truck counterweights may rest.

SHOVEL AND HOE ADDED TO HYSTAWAY

New shovel and hoe attachments for application to its Hystaway unit (as mounted on Caterpillar crawler tractors) has been developed by the Hyster Company, Portland, Ore. As a result, according to the manufacturer, one machine can be made to incorporate all of the features of a bulldozer, clamshell, dragline, crane, shovel and hoe. The new attachments, both of which are equipped with ESCO ½-yd. buckets, can be installed, it is said, without major alterations to existing machines.

The new shovel and hoe fronts are each available in one size only, the shovel being somewhat larger in size than, and the hoe about the same size as, the average ½-yd. conventional unit. The standard bucket width on the hoe front, including side cutting teeth, is 33 in., but buckets of special width are available upon request. A dipper trip drum is included with the shovel attachment and can be installed on the hoist without replacing any major parts. The drum, it is said, does not interfere with dragline, crane or hoe operations and may be left in place permanently. The new shovel and hoe may be used on Caterpillar D8 and D7 tractors. They are not, however, recommended for installation on the D6 model because of the length of the boom.



A Hyster Hystaway equipped with the new shovel attachment

NEW MACHINE FOR DOWELING TIES

The Graham Tie Dowel Service Company, Columbus, Ohio, is offering, on a lease basis, a machine for rapid insertion of spiral (anti-splitting) dowels in crossties, switch ties, bridge ties and similar timbers. Equipped with sequence valves and limit switches, the machine is entirely automatic and is controlled by a push button. With a single unit two separate operations are required to dowel both ends of a tie; with a double unit, both ends can be doweled simultaneously.

A single machine consists essentially of a centrally-located, hydraulic-cylinder-actuated press; a roller-and-track mounted drill stand on one side of the press, with two motor-driven drill bits; and a magazine-fed dowel pusher on the other side of the press—all mounted on a structural steel base. The press is adjustable for the doweling of timbers up to 18 in. in width, and the drills can be adjusted to produce holes from 2½ in. to 9½ in. apart.

In single-unit operation the tie is fed to the machine on a roller track. When the entering end reaches the first position, the press closes automatically, holding the tie firmly and exerting on the tie end any predetermined pressure from 12 to 30 tons, closing all large checks or splits. When the required pressure is reached, the drill stand moves forward, forcing the drill bits through the tie. As soon as the holes are drilled the drill stand retreats to its original position, while, simultaneously, dowels are forced into the holes from the opposite side of the tie by the dowel pusher, which causes rotation of the dowels, creating their own threads within the tie. When the dowels are in place the press opens automatically, and the tie is pushed through the machine onto a leaving roller track to the second boring and doweling position. Here, the operation is repeated for the opposite end of the tie. It is said that three ties can be doweled per minute.

Where a double doweling unit is used, the tie is first fed to a conveyor consisting of two chains, driven by a speed reducer directly connected to an electric motor. After the tie reaches the approximate position where it is to be bored and doweled, the conveyor stops and the tie is centered by a centering device automatically set in motion. The presses, drills and dowel pushers of both units then operate in unison, causing both ends of the tie to be processed simultaneously. Under this setup it is said that six ties can be doweled per minute.

Applying dowels to a tie in a double-unit operation. Note drill stand, drills, hydraulic press, and dowel pusher magazine at near end of tie in the machine

Communications . . .

Assembly Line Production Began in the Railroad Industry

CLEVELAND, OHIO

TO THE EDITOR:

There seems to be a rather widespread impression that the assembly line system of production under which most automobiles are built is a product of the automotive industry. It may be of interest to know that railroad freight cars were built on an assembly line back at the turn of the century.

In 1902 I was helping inspect an order of 40-ton, 36-ft. wooden gondola cars under construction for the Lake Shore & Michigan Southern (now New York Central) at the old Michigan-Peninsular car plant at Detroit. In the construction of these cars the trucks were assembled outside the building and moved inside to a spot where the body bolsters were placed on the trucks, and the wooden center sills—with draft castings bolted to them—were bolted to the body bolsters. The couplers and draft gears were then installed, and there was the first stage of a freight car.

There were nine or ten such spots on the assembly track, and at the end of each hour the partially completed cars were coupled together and pulled down one spot so that every hour they pulled a car off the end of the line complete in every detail except for the final coat of paint and stenciling.

As the cars progressed, the material—including lumber, castings, bolts, etc., all counted out—was set down at the various spots and assembled in place before the track was pulled. Each spot had its own gang of men who stayed in place and performed regularly assigned operations.

The principal difference between this system and the one later adopted by the automobile companies was that the railroad cars moved on their own wheels instead of on a conveyor.

A. R. AYERS
General Manager—Retired
Nickel Plate Road

Has Management the Courage to Defend Enterprise?

CHICAGO

TO THE EDITOR:

The lead editorial and related news article referring to means of defending private enterprise, in the December 4, 1948, *Railway Age*, are timely, courageous, and desperately important. You have, I think, put your finger squarely on the real crisis in the railway industry: will the leaders of that industry fearlessly and honestly examine the hard and indisputable facts of the current situation to find out whether they are doing everything in their power to guarantee the maintenance and healthy growth of private enterprise? And if they find they are not, will they have the sense and courage (your word "guts" is better) to make whatever changes in policy and action seem necessary *even though* it may mean a frank admission of past errors and a wholesale swallowing of pride?

Regardless of how short-sighted and illogical certain labor leaders and their publications may be, regardless of how disturbing it is that your correspondent Warren J. Kiefer (also in your December 4 issue) feels the way he does, they *do* think and, what's more, *act* along the lines they have clearly indicated in the excerpts and communication printed in your pages. You and I and everyone in the railway game know that many thousands of railway employees feel the same way.

At the moment, it is labor that is most "out of tune" with management, but the general public has before, and can again, adopt a hostile attitude unless the industry's leaders give unmistakable and specific evidence that they are aware of and determine to solve their own problems (specifically including labor's disaffection), and in so doing render possible the very best transportation service in the world.

Time is running out. Labor, the government, and the public are all far more articulate than rail management, and labor, at least, is far more unified. The railroads *must* begin literally *to act on principle;* according to their own testimony that principle is the maintenance of private enterprise within the framework of an economy regulated in the public interest. They must stick to that principle through thick and thin; they must be willing to stand up and be counted as favoring it. Then, most important of all, they must act in accordance with it. As you so ably point out, such action must include the joining of specific issues whenever those issues endanger the basic principle. Only then, as I see it, can the leaders of our railways command the respect of labor and of the public.

A FORMER RAILROAD OFFICER

Raises Questions Regarding "Packaged" Water Stations

ST. PAUL, MINN.

TO THE EDITOR:

Was much interested in the article entitled "Diesel Water Stations in Packaged Units" appearing in the *Railway Age* of October 16. Would greatly appreciate having Mr. Hauser explain how he proposes to remove 1,600 gal. of water from a 2,500-gal. pressure tank, and 1,000 gal. from 6-in. or 8-in. well in 5 min. in order to supply the maximum requirement of 2,600 gal. in that length of time.

My guess is that, to take 1,600 gal. from the 2,500-gal. pressure tank, about 25 p. s. i. air pressure would have to be pumped into it before any water was put in, and that the pressure would then have to be brought up to around 135 p. s. i. with the water pump. The pressure would then be reduced to around 25 or 30 p. s. i. before 1,600 gal. would be removed.

This hardly seems practical for railway service. Also, I do not know of any turbine-type or jet-type deep-well pump suitable for supplying an average of 200 g. p. m. against a head varying from 25 to 135 p. s. i. that will fit in a 6-in. or 8-in. drilled well.

B. W. DEGEER
Engineer Water Service
Great Northern

GENERAL NEWS

Supply of Box Cars Reported "Much Easier"

Gass' monthly review also notes "slight easing" of gondola situation

Chairman Arthur H. Gass of the Car Service Division, Association of American Railroads, reported last week that the usual seasonal decline in loadings had brought "a much easier supply of box cars," shortages of that type of equipment being now "at a minimum." The report was contained in Mr. Gass' latest monthly review of the "National Transportation Situation," which also noted "some slight easing" of the gondola situation in the Middle West and South, but heavy demands for gondolas "persist along the Atlantic seaboard, particularly for import loadings of ore and scrap iron."

The decrease in requirements for box cars has been "so sharp" recently that a "considerable surplus" of such cars, "mostly of the rough loader type," has developed on several of the principal roads, the C.S.D. chairman said. He added, however, that "there continues to be a fairly strong demand for the better grade box car, particularly in the Northwestern and Central Western districts . . . where requirements to load grain have been substantial, although the pressure in these two districts has eased considerably."

Explaining the action taken to assure western roads of a box car supply adequate to take care of their demands during the first part of this year, Mr. Gass pointed out that the C.S.D.'s Special Car Order No. 50 became effective December 1, 1948. This requires Eastern, Allegheny, Pocahontas and Southern roads to load box cars owned by 13 western roads only to specified areas; and if immediate and proper loading is lacking, the western cars must be returned empty to their owners in home route or short route. With the issuance of this order, C.S.D. cancelled all orders providing for scheduled "fleet" deliveries of box cars to western roads.

Of the fleet-delivery plan, Mr. Gass said that, although it has been necessary in recent years, it served to dislocate equipment and prevent the regular return of box cars to their home roads for repairs. Moreover, the plan was "contrary to the principles of car ownership and Car Service Rules," whereas Special Car Order 50 follows "strictly the principles of car ownership."

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Reviewing the open-top car situation, Mr. Gass noted that coal production continued to trail 1947's record output—"due to considerable reduction in demands and the present favorable stock situation." Stocks of bituminous coal as of November 1, 1948, totaled 68,954,000 net tons as compared with 50,276,000 net tons on November 1, 1947. Other figures presented by Mr. Gass showed that last year's lake-cargo coal program of 52 million net tons had been exceeded by 3.7 per cent, while the iron ore shipped from Lake Superior docks totaled nearly 83 million gross tons, that program having been met to the extent of 96.4 per cent.

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Mr. Gass' further comment on the gondola situation which was mentioned above, called attention to the fact that wstern and southern roads were continuing to send gondolas owned by eastern and Allegheny lines back to their home roads under special C.S.D. orders. Those orders "must necessarily be continued while the shortages exist," Mr. Gass added. His brief reference to the flat-car situation said that requirements for this type of equipment "have relaxed to some extent during recent weeks, although the supply is still tight in the Middle West and Pacific Northwest."

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The C.S.D. chairman's comment on installations of new freight cars included reference to the 1,779 gondolas installed in November, 1948, when 1,501 were being retired. This was the first time the monthly installations of gondolas exceeded retirements "in more than three years," Mr. Gass said. "Also," he added, "the number of gondola cars awaiting repairs declined 902 in November, thus accomplishing a net increase of 1,180 in the number of serviceable cars available of this much needed type."

The report's figures on the average turn-around time of freight cars showed that it was 14.34 days in November, 1948, as compared with 12.94 days in the previous month. The number of cars detained beyond the free time averaged 15.84 per cent of the total number

Confident

"Tonight we have spent much time in discussion of the past. What about the future? I would like to say something to you with respect to Lima-Hamilton's forward engineering. Believe me when I say we still have faith in the steam locomotive. There is, and there will be, a definite place for it.

"We further believe in the Diesel engine for switching purposes and for transfer work. The time is not far off now when Lima-Hamilton will be offering to the railroads for their main-line work, both passenger and freight, the gas-turbine locomotive. It is around this engineering principle that we envisage the future. The work in this regard began five years ago in cooperation with the United States Navy. Two years were given by the best available engineers from our own company supplemented by consultants from M.I.T. for exploratory and mathematical calculations. For three years now this machine has been on the test block; the results are gratifying. A thermal efficiency of approximately 50 percent has been achieved. We confidently approach the future."

—From an address December 2 to the Newcomen Society in America by John E. Dixon, president of Lima-Hamilton Corporation.

FINANCIAL

Central of Georgia.—*Reorganization.*—Division 4 of the Interstate Commerce Commission has fixed maximum limits of final allowances for services and expenses of parties in interest and their counsel, during the period, generally, from December 7, 1945, to July 8, 1948, in connection with this road's reorganization under section 77 of the Bankruptcy Act. The commission allowed $152,586.50 on claims of $187,136.50, the largest allowance being that of $56,941.24 (on a claim of $65,941.24) to Alexander & Green, counsel for the reorganization managers; and that firm also got another allowance of $10,000 (on a claim of $15,000) as counsel for the Bankers Trust Company, trustee under the debtor's consolidated mortgage. The trust company itself was awarded the total amount of its claim, $20,420.53, while its other counsel, McLaws & Brennan, got $2,000 on a claim of $2,500. The Liberty National Bank & Trust Company, successor trustee under the debtor's first mortgage, was awarded $13,398.86, the amount of its claim, and its counsel—Debevoise, Plimpton & McLean and Hitch, Morris & Harrison—were awarded $12,163.76 and $2,500, respectively, on claims of $15,413.76 and $4,000. The Central Hanover Bank & Trust Company was allowed $4,201.27, the amount it claimed, as trustee of the debtor's collateral-trust indenture, the first mortgage of the Chattanooga, Rome & Southern, and the debtor's second preference income mortgage. This bank's counsel were Rathbone, Perry, Kelley & Drye and Anderson, Connerat, Dunn & Hunter; the former was allowed $9,000 on a claim of $12,000, and the latter was allowed the amount of their claim, $1,500. A total of $10,304.47, was allowed to the Chemical Bank & Trust Co., trustee under the debtor's general and refunding mortgage, and its counsel, the bank getting the $4,804.47 it claimed, Sherman & Sterling & Wright getting $4,500 on a claim of $6,500, and Fulcher and Fulcher, $1,000 on a claim of $2,000. The Citizens & Southern National Bank, trustee under the Chattanooga division purchase-money mortgage, was allowed $2,604.68 on a claim of $4,404.68; and its counsel, Douglas, McWhorter & Adams, got $3,603.68 on a claim of $5,103.68. Other allowances included $6,116.83, the amount claimed, to the Guaranty Trust Company, trustee under the debtor's first mortgage until it resigned as of January 9, 1942. The report noted that this bank received no notices in the proceeding after its resignation, and thus did not file a petition for allowances when such petitions were filed by others for the period in which the bank's services were rendered. On these earlier petitions, the commission had previously approved allowances totaling $829,384.04, according to the report.

Des Moines & Central Iowa.—*Reorganization.*—Division 4 of the Interstate Commerce Commission has submitted this road's approved plan of reorganization to holders of its first-mortgage bonds for acceptance or rejection under the applicable provisions of section 77 of the Bankruptcy Act. The division found that these bondholders were the only creditors entitled to vote on the plan, which was approved by the division on September 15, 1948, and by the federal district court for the Southern District of Iowa on December 3, 1948. The ballots are due at the commission's office in Washington, D. C., on or before January 10.

Macon, Dublin & Savannah.—*Bond Modification.*—Division 4 of the Interstate Commerce Commission has approved this road's plan to set back for 25 years, from January 1, 1947, to January 1, 1972, the maturity date of its first-mortgage, 5 per cent bonds which are outstanding in the amount of $1,733,000. In doing so, the division failed to heed pleas of some of the bondholders who were protesting intervenors contending that the extension should be conditioned on a guarantee of the bonds by the Seaboard Air Line. That road's predecessor company formerly guaranteed the bonds, but the guaranty was eliminated by the reorganization plan under which the present Seaboard took over the properties to end the receivership. "The Seaboard," the division's report said, "is a separate legal entity, and is under no legal obligation to guarantee applicant's extended bonds. Moreover, it has positively stated that it does not propose to undertake to do so. It thus appears that the guaranty is not available."

The extension plan was proposed by the M.D.&S. under provisions of the Interstate Commerce Act's section 20b, which was added by the so-called "Mahaffie Act." The commission approved a similar plan in 1947, but that was not consummated because the assents required to carry it through as a voluntary plan were not obtained. The plan now approved would continue the 5 per cent interstate rate on the bonds, but it provides for several modifications of the indenture, including the addition of sinking-fund provisions and restrictions on the payment of dividends on M.D.&S. stock. In prescribing conditions under which the plan will be submitted to the bondholders, the division refused to require the applicant to transmit with the plan a communication from one of the protesting bondholders; but it did require that the applicant shall make a list of the names and addresses of the bondholders available, upon request, to parties in the proceeding. Also, it stipulated that the plan shall not be submitted to the Seaboard, because the $5,000 of the bonds held by that road are "not to be deemed outstanding within the meaning of paragraphs (2) and (3) of section 20b." The effective date of the division's order is January 8, and it provides that the submission of the plan shall be on or before 15 days from, but not earlier, than that date; and that acceptances or rejections shall be made within 30 days from the same date, "unless the time therefor is extended by subsequent order."

Maine Central.—*Trackage Rights.*—Division 4 of the Interstate Commerce Commission has authorized the acquisition by this road of trackage rights over the 12.7-mile line of the Atlantic & St. Lawrence (Canadian National) between Groveton, N. H., and North Stratford. The M.C. already had trackage rights over the Boston & Maine's 8.8-mile line between Coos Junction and Groveton; so the arrangement now approved will permit it to continue service between Coos Junction and North Stratford, where abandonment of its own 19.4-mile line was authorized by the same decision.

St. Louis-San Francisco.—*Control of A. T. & N.*— Division 4 of the Interstate Commerce Commission has authorized the St. Louis-San Francisco to acquire control of the Alabama, Tennessee & Northern and thereby extend its line to Mobile, Ala. The acquisition plan contemplates purchase by the Frisco of all outstanding and unpledged A. T. & N. stock and bonds for $1,161,140, including $311,525, or $25 a share, for 12,461 shares of no-par stock and $849,615, or $650 per $1,000, for bonds having a principal face amount of $1,307,100. As of December 7, 1948, the report said in a footnote, 94.615 per cent of the stock and 98.841 per cent of the bonds had been deposited under the acquisition plan's escrow agreement.

In leading up to its approval of the Frisco proposal, the division reviewed evidence indicating the poor condition of the A. T. & N. line and freight cars, and cited the operating deficits incurred since 1946. "It is clear from the record," the report added, "that the Alabama company cannot continue to operate its system under the present arrangement indefinitely." In this connection it was pointed out that the Frisco, after consummation of the purchase, plans to advance funds necessary for the A. T. & N. to meet its accruing liabilities and rehabilitate its properties. The cost of the rehabilitation was estimated at $2,076,000, which would be spent in two years "in addition to normal maintenance expense of $433,500 a year."

Can't Advise and Bid On Same Rail Securities

The Interstate Commerce Commission has ruled that banking firms acting as advisers for a fee in connection with the planning and marketing of railroad securities will not hereafter be permitted to bid on the issues involved. The ruling was not made retroactive, however, so the commission's December 16, 1948, report by Division 4 approved

GENERAL NEWS

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CROSSTIE INDUSTRY SIZES UP ITS RESOURCES—The National Security Resources Board, which is developing policies and programs for maximum use of the Nation's resources in case of another emergency, is calling upon industry task groups to survey their respective industries and make recommendations on which to base final determinations for consideration by the President. Task group recommendations later will be reviewed by formal industry-wide advisory committees before being passed on by the Board. The above group, representing the railway crosstie industry, includes (left to right): T. J. Turley, Bond Brothers, Louisville, Ky.; Walter P. Arnold, Wood Preserving Division, Koppers Company, Pittsburgh, Pa.; T. H. Wagner, Gross & James Co., St. Louis, Mo., and president of the American Wood Preservers' Association, and John D. Mylrea, director of the board's forest products division

placed in November. This compared with 16.17 per cent for October and 14.6 per cent for November, 1947.

Whittemore States New Haven Policy

The New York, New Haven & Hartford will earn in 1948 between $5,000,000 and $6,000,000 after paying its fixed and contingent charges, Laurence F. Whittemore, president of the road, said at New Haven, Conn., on December 28. But, he added, the earnings will be "insufficient to establish our credit or do the things we feel are necessary to make the New Haven what it should be."

The present management of the New Haven, Mr. Whittemore said at a dinner attended by the road's directors, the mayor and a group of representative businessmen of New Haven, has as its announced purpose, "to build a finer and more efficient New Haven railroad, rather than to concentrate on quick profits for themselves. When I accepted the position of president of this company, I did so, in part, because it was the expressed purpose of its controlling owner that we should plow back into the property as much of our earnings as is possible."

"It has been, and is, the task of the present management to put its business house in order by a substantial reduction in the number of people employed by the New Haven as well as the number of activities not strictly railroad business in which the company has engaged.

"If our company is to make enough money to restore its credit it must be operated economically and efficiently. This presupposes that activities not necessary will be eliminated and that the work load of every job will be scrutinized. We must not stop until every man on our railroad has a full-time necessary day's work on his hands. We shall endeavor to bring about this result with as little personal hardship to individuals and communities as possible."

Whittemore said that, in the future, it is planned to "hold the meetings of our directors in the various important centers on our lines, so that we may get better acquainted with their problems and so that their citizens may become better acquainted with our problems."

January 5 Now Date of Hearing On Official-Southwest Divisions

January 5 has now been set by the Interstate Commerce Commission as the date for hearings in connection with its investigation of divisions of joint class and all-commodity rates between points in Official territory and points in Southwestern territory. The hearing, previously scheduled for January 4, will be held at Washington, D. C., before Examiner Howard Hosmer.

Grand Trunk Opens New Passenger Station at Grand Rapids, Mich.

A new passenger station at Grand Rapids, Mich., built by the Grand Trunk Western at a cost of $200,000, was officially opened with special ceremonies on December 21. A gold key to the station was presented by C. A. Skog, vice-president and general manager of the railroad, to Mayor George W. Welsh of Grand Rapids. Some 175 business leaders of the city attended the ceremonies and a buffet luncheon served on Grand Trunk diners.

The location of the new station eliminates a backhaul of 1½ mi. required at the old facility, thus enabling the road to speed up its schedules. Simple and modern in design, the structure utilizes setbacks, curved surfaces and glass block panels to relieve the large areas of brickwork. A metal canopy protects the passenger entrances from the weather.

The interior of the building is also modern and functional in design. The floor is of patterned terrazzo surface, and the surfaces of the walls are offset by a marbleized wainscoting. Acoustic tile materials have been used for the ceiling. The station is lighted during daylight hours by clerestory windows at high levels and at night by fluorescent-type fixtures.

Freight Car Loadings

Car loading figures for the week ended December 25 were not available when this issue went to press.

Loadings of revenue freight for the week ended December 18 totaled 754,545 cars, and the summary for that week as compiled by the Car Service Division, Association of American Railroads, follows:

Revenue Freight Car Loadings

For the week ended Saturday, December 18

District	1948	1947	1946
Eastern	140,554	155,969	157,103
Allegheny	153,473	173,244	171,206
Pocahontas	61,811	68,570	74,111
Southern	132,215	138,252	140,705
Northwestern	80,134	90,572	86,919
Central Western	118,369	138,625	137,286
Southwestern	67,989	66,898	68,855
Total Western Districts	266,492	296,095	293,060
Total All Roads	754,545	832,130	836,185
Commodities:			
Grain and grain products	48,519	45,760	53,335
Livestock	11,479	11,956	15,653
Coal	160,088	192,720	198,310
Coke	15,191	15,572	14,301
Forest products	42,659	44,945	46,207
Ore	15,260	16,689	12,805
Merchandise l.c.l.	93,447	112,561	122,007
Miscellaneous	367,902	391,927	373,567
December 18	754,545	832,130	836,185
December 11	783,276	854,159	828,751
December 4	804,183	878,588	729,084
November 27	723,090	792,331	660,911
November 20	857,492	902,662	806,593
Cumulative total 50 weeks	42,224,663	43,902,834	40,713,311

Chicago Wants RRs to Consolidate Stations, Not Just Modernize Them

The city of Chicago last week indicated that it will reject a plan proposed by the railroads terminating on the city's south side, whereby they would modernize four passenger depots south of the "loop" and relocate certain freight stations rather than consolidate the facilities in one or two terminals. Submitted last August to Mayor Martin H. Kennelly by the Chicago South Side Terminal Committee, headed by Fred G. Gurley, president of the Atchison, Topeka & Santa Fe (see *Railway Age* of September 4, 1948, page 52), the railroads' report emphasized that consolidation of the stations would cost more than the railroads could afford.

As this issue went to press, the terminal committee had received no official notice of the city's dislike for its plan, but Mayor Kennelly was reported in the press on December 22 as saying that the carriers' proposal "would not accomplish the things the city needs" and that negotiations would be re-opened with the railroad committee. The latter, prior to rendering its report last August 27, had completed a 2½-year study of the financial and engineering aspects of the terminal problem.

Cost-Cutting Theme of Sessions At Materials Handling Exposition

In conjunction with equipment displays at the Third Annual Materials Handling Exposition, to be held at the Philadelphia (Pa.) Convention Hall, January 10-14, inclusive, the Materials Handling division of the American Society of Mechanical Engineers is sponsoring a group of technical sessions, the theme of which will be cutting costs in all phases of industry. After the prologue session on Monday afternoon, January 10, the "bread and butter" conferences will begin on Tuesday. The program is as follows:

TUESDAY, JANUARY 11

10:00 a.m.

Opportunities for management. Included in this session will be the economics of materials handling and a discussion of the materials handling engineer, his qualifications and place in the management scheme.

2:00 p.m.

Improvements in methods. Discussions of work simplification in materials handling and opportunities for distribution economies will highlight this meeting. At this time industry will present its recommendations to the carriers on rate concessions where pallets are used, etc. Carrier representatives will reply.

WEDNESDAY, JANUARY 12

9:30 a.m.

Case studies in modern materials handling. Co-ordination of facilities for materials handling in a manufacturing plant, applications of equipment to the handling of awkward shapes of materials, and the "ups and downs" of handling in multi-story warehouses will be the topics for this session.

2:00 p.m.

Co-ordinating materials handling with related engineering and management functions. Safety, industrial relations, cost control, lighting and building construction will be taken up in this panel discussion.

THURSDAY, JANUARY 13

9:30 a.m.

Advances in technique. Automatic pallet loading, equipment, layout, operation, and the solution of application problems, along with developments in bulk handling, will be dealt with in this forum.

2:00 p.m.

Recent advances in materials handling equipment. Marking and stenciling, and developments in the design and application of industrial trucks, conveyors, cranes, hoists and elevators will be the features of this assembly.

FRIDAY, JANUARY 14

9:30 a.m.

Materials handling of tomorrow. Representatives of the Army and Air Forces will discuss, respectively, the Army's materials handling job and lessons from the Berlin "Airlift," while an air transportation man will tell of materials handling in the air-freight transportation field.

NEW HAVEN CELEBRATES 100TH ANNIVERSARY OF ENTRY TO NEW YORK

Just one hundred years ago last Monday, December 27, 1948, the first New Haven Railroad ran its first train into the city of New York, an event that was met with tremendous enthusiasm by the press and public of the day and an entry that was made possible through a special agreement with the old New York & Harlem Railroad for use of their right-of-way.

The first train made the trip into the Canal Street station from New Haven, Conn., and returned to New Haven the same day. It was reported that "the first regular train from New Haven . . . arrived at New York in the running time of less than four hours, although the track was obstructed by snow."

The road's first station was on Canal street, near Broadway. By 1851, however, a new station was built at Canal and Centre streets. The cars were hauled downtown by horses. In July, 1857, the road moved into newer quarters uptown at Fourth avenue and 27th street and horse power was discarded.

Faricy's Speech to Atlantic Board Scheduled for January 13

The silver anniversary dinner of the Atlantic States Shippers Advisory Board, at which William T. Faricy, president of the Association of American Railroads, is to be the guest speaker, will be held at the Biltmore Hotel in New York on Thursday, January 13, instead of on January 14, as reported in the *Railway Age* of December 25, 1948.

Southern Receives Certificate

The Southern has been awarded a "Certificate of Merit" by the South Carolina State Forestry Commission for "sound forest management and conservation" of its 14,000-acre Lincoln Green demonstration forest at Dorchester, S. C. The forest, which origis described in an article beginning on page 32 of this issue.

Hearing Set for February 28 On Western Traffic Agreement

The Interstate Commerce Commission has set February 28 as the date for hearings on the application of carrier members of the Western Traffic Association for approval of their proposed rate-procedures agreement. The hearings will be held at Washington, D. C., before the commission's Division 2, consisting of Commissioners Alldredge, Rogers and Barnard.

That procedure had been sought by the National Industrial Traffic League, which suggested that the proceeding (Section 5a Application No. 2) be made a "test case" so that the league could present "such facts and argument as may be appropriate to the consideration by the commission of the general requirements, safeguards and formalities which should be observed in agreements among carriers." At the same time, the league indicated its general support of the application (see *Railway Age* of December 11, 1948, page 73).

Meanwhile, Division 2 has extended from January 5 until February 7 the period within which the Department of Justice may file detailed specifications of its objections to the proposed agreement; and it has fixed the same deadline for the filing by the department of objections to the similar agreement proposed by eastern railroads. The agreements were filed with the commission under the provisions of the Interstate Commerce Act's section 5a, which was added last June by the Bulwinkle-Reed Act.

U. P. MAKES $50,000 MOVIE TO CUT CROSSING ACCIDENTS

A realistic sound-color motion picture which required six months to film, at a cost of nearly $50,000, has been released by the Union Pacific as part of its campaign to reduce the toll of highway grade crossing accidents. Climactic highlight of the film, entitled "Look, Listen and Live," is a train wreck caused by a careless motorist. To make the scene, a derrick was used to lay an entire train—locomotive, tender and two box cars—on its side along the right-of-way. Ambulances, highway patrolmen and leaping flames add color to the "tragedy."

The railroad is releasing 41 prints of the 26-minute, 16-mm. movie, along with some 500,000 copies of a two-color, 12-page booklet. The latter features the grade crossing demise of a pathetically-humorous pen-and-ink sketch character named Dizzy Dan. Distribution of both film and booklet will be chiefly through the highway patrols of the 11 western states served by the railroad. The patrols will screen the picture for school and civic groups and will pass out the booklet at the showings.

Faricy Heads Railroad Committee for Inauguration

Appointment of a committee of representatives of the railroads and the Pullman Company to make arrangements for handling those who plan to travel by rail to the inauguration of President Truman on January 20 was announced on December 26 by William T. Faricy, president of the Association of American Railroads and chairman of the Railroad Committee of the National Transportation Committee for the 1949 inaugural. This is one of three committees on transportation under the chairmanship of Stephen H. Harrington, of St. Paul, Minn.

Among the subjects to be considered by the committee, Mr. Faricy stated, are arrangements for rail travel to the inaugural, publicity at points of origin of special trains and groups traveling on scheduled trains or in regular and extra service, and appointment of a

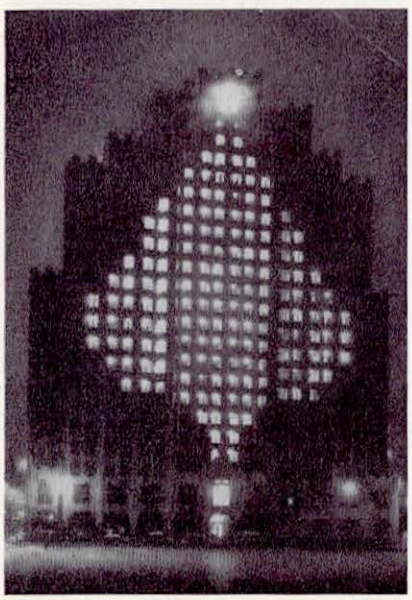
subcommittee to have direct contact with the National Transportation Committee in Washington. Included on the Railroad Committee are:

Walter J. Kelly, traffic officer of the A.A.R., vice chairman; H. W. Fraser, chairman, Railway Labor Executives' Association; James B. Sharpton, passenger traffic manager, Atlantic Coast Line; John F. Whittington, general passenger traffic manager, Baltimore & Ohio; J. C. Ostrom, passenger traffic manager, Chesapeake & Ohio; Earle R. Comer, passenger traffic manager, Pennsylvania; W. M. Taylor, traffic manager, Richmond, Fredericksburg & Potomac; C. Edwin Bell, general passenger traffic manager, Seaboard Air Line; Frank L. Jenkins, general passenger traffic manager, Southern; Justin J. Nolan, assistant passenger traffic manager, Pullman Company; Bernard R. Tolson, manager, Washington Terminal Company; Frank Van Ummersen, chairman, New England Passenger Association; Vanderbilt Armold, chairman, Trunk Line-Central Passenger Associations; Morton B. Duggan, chairman, Southern Passenger Association; Earl B. Padrick, chairman, Transcontinental-Western Passenger Associations, and V. T. Corbett, chairman, Southwestern Passenger Association.

After the committee's first meeting in Washington, D. C., on December 28, Vice-Chairman Kelly announced that commitments had already been made for the use of more than 425 Pullman cars and "many" extra coaches by those who plan to travel by rail to the inauguration.

Mr. Kelly said that 225 of the sleeping cars already ordered for service would be parked in yards of Washington for one or more nights and that passengers could return to their cars to sleep. Another 100 of the assigned cars will be used for organized group movements and 100 additional cars are to be made available for similar movements. Besides these cars, parlor cars will be available for day service and coaches will be made up into extra trains or special sections of regularly scheduled trains as they are required. The Railroad Committee can foresee no difficulty in handling the passenger travel to Washington for the inauguration of President Truman, Mr. Kelly stated.

Grandstand tickets for the inaugural parade will be made available through the railroads for those traveling to the inauguration by rail, Mr. Kelly added.



M. P. LIGHTS UP "WORLD'S LARGEST CHRISTMAS TREE"—A 22-story "Christmas tree" topped by a gigantic "star" has made its annual holiday season appearance on the Missouri Pacific's general office building at St. Louis, Mo. The tree is formed by a blacking out of certain windows and the continued illumination of others. When lighted it towers over the St. Louis civic center and plaza in the heart of the downtown section

Canadian Rate Increase Hearings To Begin at Ottawa January 11

The Board of Transport Commissioners for Canada will hold hearings in the Union Station building at Ottawa, Ont., beginning at 10:30 a.m. on January 11, on the application filed by the Canadian railroads on July 27, 1948, for general and interim freight-rate increases of 20 and 15 per cent, respectively.

The board will at the same time consider complaints filed by the governments of British Columbia and six other Canadian provinces, asking for relief from the board's order No. 70425, dated March 30, 1948, which provided, with certain exceptions, for a general 21 per cent freight and express rate increase. (See *Railway Age* of September 11, 1948, page 82, and September 25, 1948, page 61.)

Forecast Puts Loadings 2.1 Per Cent Above 1948's First Quarter

Freight carloadings in the first quarter of 1949 are expected to be 2.1 per cent above those in the same period in 1948, according to estimates made by the 13 regional Shippers Advisory Boards.

On the basis of these estimates, freight carloadings of the 32 principal commodity groups will be 7,505,850 cars in the first quarter of 1949, compared with 7,348,442 actual carloadings for the same commodity groups in the corresponding period of the preceding year. Eight of the 13 boards estimate an increase in carloadings for the first quarter, compared with the same period in 1948, and five—the Pacific Northwest, Mid-West, Southwest, Atlantic States and New England regions—expect reductions.

The tabulation shows actual carloadings for each district in the first quarter of 1948, the estimated loadings for the first quarter of 1949, and the percentage of increase or decrease.

The 13 boards expect an increase in the first quarter of 1949, compared with the same period one year ago, in the loading of 21 of the commodity groups listed and a decrease in 11. Among those showing the increases are the following: Grain, 20.5 per cent; frozen foods, fruits and vegetables, 11.4 per cent; potatoes, 10.4 per cent; cottonseed, soybean-vegetable cake and meal, except oil, 9 per cent; vehicle parts, 8 per cent; lime and plaster, 7.8 per cent; ore and concentrates, 5.7 per cent; agricultural implements and vehicles other than automobiles, 5.5 per cent; cement, 5.4 per cent; food products in cans and packages, 5 per cent; salt, 4.5 per cent; sugar, syrup and molasses, 4.3 per cent; gravel, sand and stone, 3.9 per cent; chemicals and explosives, 3.8 per cent; coal and coke, 2.6 per cent.

Commodities for which decreases are estimated and the amount of decrease include the following: Poultry and dairy products, 12.6 per cent; fresh fruits, other than citrus fruits, 10.7 per cent; hay, straw and alfalfa, 9.5 per cent; automobiles and trucks, 9.5 per cent; petroleum and petroleum products, 7.6 per cent; livestock, 3.5 per cent.

Shippers Advisory Boards	Actual Loadings First Quarter of 1948	Estimated Loadings First Quarter of 1949	Per Cent Increase
Great Lakes	440,108	449,980	2.2
Ohio Valley	1,018,251	1,031,546	1.3
Mid-West	885,385	864,278	2.4 dec.
Northwest	248,811	266,976	7.3
Trans-Mo.-Kansas	368,714	398,005	7.9
Southeast	936,522	963,416	2.9
Southwest	538,584	521,402	3.2 dec.
New England	165,445	163,190	1.4 dec.
Atlantic States	858,035	857,972	0.01 dec.
Allegheny	1,052,076	1,121,559	6.6
Central Western	273,164	285,651	4.6
Pacific Coast	332,032	354,529	6.8
Pacific Northwest	231,315	227,346	1.7 dec.
Total	7,348,442	7,505,850	2.1

ORGANIZATIONS

"Changes in the 1949 A.A.R. Code of Rules" will be the subject of an address by R. W. Hollon, mechanical inspector, Chicago, Burlington & Quincy, at the next meeting of the **Car Foremen's Association of Chicago** on January 10, at the LaSalle Hotel, Chicago.

The next meeting of the **Northwest Car Men's Association** will be held on January 10, at 8:00 p.m., at 1931 University avenue, St. Paul, Minn. "Changes in A.A.R. Rules of Interchange, Effective January 1," will be the subject for discussion.

The **Railfan Society** will hold its first meeting on January 10, at 8:00 p.m., at 20 W. 40th street, New York. The meeting will feature amateur and professional movies of the Pennsylvania and a guest speaker from that road. The next Railfan trip will be on the New York City Transit System's Independent division, on January 15, from 4 to 11 p.m.

SUPPLY TRADE

The appointment of **Robert L. Sommerville** as Exide's assistant general sales manager has been announced. Mr. Sommerville, formerly manager of automotive sales, has been in the employ of the **Electric Storage Battery Company** for 30 years.

Joseph T. Ryerson & Son, Inc. has announced the election of **William Seymour, Jr.** as vice-president, **C. L. Hardy** as assistant vice-president and **Thomas G. Miller** as secretary.

George L. Mitsch has been appointed plant manager at the St. Louis (Mo.) foundry of the **American Car & Foundry Co.** Mr. Mitsch began his business career at the Berwick, Pa., plant of American Car & Foundry. In 1942 he joined the Eastern Aircraft division of

George L. Mitsch

the General Motors Corporation at Trenton, N. J., and, in 1945, returned to American Car & Foundry in the St. Louis foundry. He later was appointed assistant plant manager, which position he held at the time of his recent promotion.

The **American Locomotive Company** has announced the removal of its public relations department from New York City to Schenectady, N. Y., from which headquarters the department will continue to handle all phases of the company's public relations activities.

S. E. Gillespie, vice-president of the **Western Railroad Supply Company,** Chicago, has been elected president of the firm, succeeding the late **Godfrey Gort,** whose death was reported in the *Railway Age* of October 30, 1948.

L. J. Suelzer has been appointed manager of the newly created Pittsburgh, Pa., district office of **Bowser, Inc.,** with headquarters at 502 Oliver building. **T. R Schannen** will succeed Mr. Suelzer as manager of the lubrication and filtration sales division at the home office in Fort Wayne, Ind. **C. P. Menard,** formerly lubrication and filtration engineer at Pittsburgh, has been appointed sales engineer, reporting to Mr. Suelzer.

Eugene C. Schum has been appointed Diesel engine sales manager of the Hamilton division of the **Lima-Hamilton Corporation,** with headquarters in Hamilton, Ohio. Mr. Schum began his business career in 1935 when he joined the

Eugene C. Schum

engineering department of the Nordberg Manufacturing Company. From 1942 to 1945 he served as a lieutenant commander in the United States Navy, after which he returned to Nordberg as district sales manager, holding that position until he joined Lima-Hamilton.

William L. Norvell has been appointed sales manager for the Vericon television department of **Remington Rand Inc.** Mr. Norvell will divide his time be-

William L. Norvell

tween the Remington Rand Laboratory of Advanced Research, South Norwalk, Conn., and the main offices in New York.

The **General Railway Signal Company** has announced the following changes in its personnel: **Benjamin P. Wayne,** secretary and assistant treasurer, appointed secretary-treasurer; **William R. Nash,** associated with the firm's treasury department since 1925, appointed assistant treasurer; **Jacob A. Geneser,** resident manager of the St. Louis (Mo.) office, retired, and **Roy Lee Morris,** sales engineer at the St. Louis office, appointed resident manager there.

George O. With, manager of sales, construction industries, **Carnegie-Illinois Steel Corporation** (subsidiary of the United States Steel Corporation), at Chicago, has been appointed assistant vice-president of the **United States Steel Supply Company** (also a subsidiary of U. S. Steel). Mr. With is succeeded by his assistant, **Dwight L. Merrell.**

Philip H. Clapp, Jr., formerly sales representative of the **American Brake Shoe Company,** has been appointed sales manager of the engineered castings division, with headquarters as before in Roches-

Philip H. Clapp, Jr.

ter, N. Y. Mr. Clapp joined Brake Shoe in 1946. He was graduated from the University of Michigan and during World War II served as a lieutenant commander in the United States Navy.

Walter D. Monroe, Jr., vice-president of the **Chicago Steel Service Company,** has been elected president of the firm, succeeding his late father. **Donald F. Grace,** vice-president, has been appointed vice-president in charge of sales.

Maurice Davier, formerly a member of the Johns-Manville Corporation's executive staff at New York, has been appointed general manager of **Van Cleef Brothers, Inc.,** Chicago, a division of **Johns-Manville.**

OBITUARY

C. A. Pinyerd, special agent and former manager of the Chicago office of the Safety Car Heating & Lighting Co., died at St. Luke's Hospital in Chicago on December 22, following a short illness.

FINANCIAL

Central of Georgia. *Reorganization.*—Division 4 of the Interstate Commerce Commission has fixed maximum limits of final allowances for services and expenses of parties in interest and their counsel, during the period, generally, from December 7, 1945, to July 8, 1948, in connection with this road's reorganization under section 77 of the Bankruptcy Act. The commission allowed $152,580.50 on claims of $187,136.50, the largest allowance being that of $56,941.24 (on a claim of $65,941.24) to Alexander & Green, counsel for the reorganization managers; and that firm also got another allowance of $10,000 (on a claim of $15,000) as counsel for the Bankers Trust Company, trustee under the debtor's consolidated mortgage. The trust company itself was awarded the total amount of its claim, $20,420.53, while its other counsel, McLaws & Brennan, got $2,000 on a claim of $2,500. The Liberty National Bank & Trust Company, successor trustee under the debtor's first mortgage, was awarded $13,398.86, the amount of its claim, and its counsel—Debevoise, Plimpton & McLean and Hitch, Morris & Harrison—were awarded $12,163.76 and $2,500, respectively, on claims of $15,413.76 and $4,000. The Central Hanover Bank & Trust Company was allowed $4,201.27, the amount it claimed, as trustee of the debtor's collateral-trust indenture, the first mortgage of the Chattanooga, Rome & Southern, and the debtor's second preference income mortgage. This bank's counsel were Rathbone, Perry, Kelley & Drye and Anderson, Connerat, Dunn & Hunter; the former was allowed $9,000 on a claim of $12,000, and the latter was allowed the amount of their claim, $1,500. A total of $10,304.47, was allowed to the Chemical Bank & Trust Co., trustee under the debtor's general and refunding mortgage, and its counsel, the bank getting the $4,804.47 it claimed, Sherman & Sterling & Wright getting $4,500 on a claim of $6,500, and Fulcher and Fulcher, $1,000 on a claim of $2,000. The Citizens & Southern National Bank, trustee under the Chattanooga division purchase-money mortgage, was allowed $2,604.68 on a claim of $4,404.68; and its counsel, Douglas, McWhorter & Adams, got $3,603.68 on a claim of $5,103.68. Other allowances included $6,116.83, the amount claimed, to the Guaranty Trust Company, trustee under the debtor's first mortgage until it resigned as of January 9, 1942. The report noted that this bank received no notices in the proceeding after its resignation, and thus did not file a petition for allowances when such petitions were filed by others for the period in which the bank's services were rendered. On these earlier petitions, the commission had previously approved allowances totaling $829,384.04, according to the report.

Des Moines & Central Iowa. *Reorganization.*—Division 4 of the Interstate Commerce Commission has submitted this road's approved plan of reorganization to holders of its first-mortgage bonds for acceptance or rejection under the applicable provisions of section 77 of the Bankruptcy Act. The division found that these bondholders were the only creditors entitled to vote on the plan, which was approved by the division on September 15, 1948, and by the federal district court for the Southern District of Iowa on December 3, 1948. The ballots are due at the commission's office in Washington, D. C., on or before January 10.

Macon, Dublin & Savannah. *Bond Modification.*—Division 4 of the Interstate Commerce Commission has approved this road's plan to set back for 25 years, from January 1, 1947, to January 1, 1972, the maturity date of its first-mortgage, 5 per cent bonds which are outstanding in the amount of $1,733,000. In doing so, the division failed to heed pleas of some of the bondholders who were protesting intervenors contending that the extension should be conditioned on a guarantee of the bonds by the Seaboard Air Line. That road's predecessor company formerly guaranteed the bonds, but the guaranty was eliminated by the reorganization plan under which the present Seaboard took over the properties to end the receivership. "The Seaboard," the division's report said, "is a separate legal entity, and is under no legal obligation to guarantee applicant's extended bonds. Moreover, it has positively stated that it does not propose to undertake to do so. It thus appears that the guaranty is not available."

The extension plan was proposed by the M.D.&S. under provisions of the Interstate Commerce Act's section 20b, which was added by the so-called "Mahaffie Act." The commission approved a similar plan in 1947, but that was not consummated because the assents required to carry it through as a voluntary plan were not obtained. The plan now approved would continue the 5 per cent interstate rate on the bonds, but it provides for several modifications of the indenture, including the addition of sinking-fund provisions and restrictions on the payment of dividends on M.D.&S. stock. In prescribing conditions under which the plan will be submitted to the bondholders, the division refused to require the applicant to transmit with the plan a communication from one of the protesting bondholders; but it did require that the applicant shall make a list of the names and addresses of the bondholders available, upon request, to parties in the proceeding. Also, it stipulated that the plan shall not be submitted to the Seaboard, because the $5,000 of the bonds held by that road are "not to be deemed outstanding within the meaning of paragraphs (2) and (3) of section 20b." The effective date of the division's order is January 8, and it provides that the submission of the plan shall be on or before 15 days from, but not earlier, than that date; and that acceptances or rejections shall be made within 30 days from the same date, "unless the time therefor is extended by subsequent order."

Maine Central. *Trackage Rights.*—Division 4 of the Interstate Commerce Commission has authorized the acquisition by this road of trackage rights over the 12.7-mile line of the Atlantic & St. Lawrence (Canadian National) between Groveton, N. H., and North Stratford. The M.C. already had trackage rights over the Boston & Maine's 8.8-mile line between Coos Junction and Groveton; so the arrangement now approved will permit it to continue service between Coos Junction and North Stratford, where abandonment of its own 19.4-mile line was authorized by the same decision.

St. Louis-San Francisco. *Control of A. T. & N.*—Division 4 of the Interstate Commerce Commission has authorized the St. Louis-San Francisco to acquire control of the Alabama, Tennessee & Northern and thereby extend its line to Mobile, Ala. The acquisition plan contemplates purchase by the Frisco of all outstanding and unpledged A. T. & N. stock and bonds for $1,161,140, including $311,525, or $25 a share, for 12,461 shares of no-par stock and $849,615, or $650 per $1,000, for bonds having a principal face amount of $1,307,100. As of December 7, 1948, the report said in a footnote, 94.615 per cent of the stock and 98.841 per cent of the bonds had been deposited under the acquisition plan's escrow agreement.

In leading up to its approval of the Frisco proposal, the division reviewed evidence indicating the poor condition of the A. T. & N. line and freight cars, and cited the operating deficits incurred since 1946. "It is clear from the record," the report added, "that the Alabama company cannot continue to operate its system under the present arrangement indefinitely." In this connection it was pointed out that the Frisco, after consummation of the purchase, plans to advance funds necessary for the A. T. & N. to meet its accruing liabilities and rehabilitate its properties. The cost of the rehabilitation was estimated at $2,076,000, which would be spent in two years "in addition to normal maintenance expense of $433,500 a year."

Can't Advise and Bid On Same Rail Securities

The Interstate Commerce Commission has ruled that banking firms acting as advisers for a fee in connection with the planning and marketing of railroad securities will not hereafter be permitted to bid on the issues involved. The ruling was not made retroactive, however, so the commission's December 16, 1948, report by Division 4 approved

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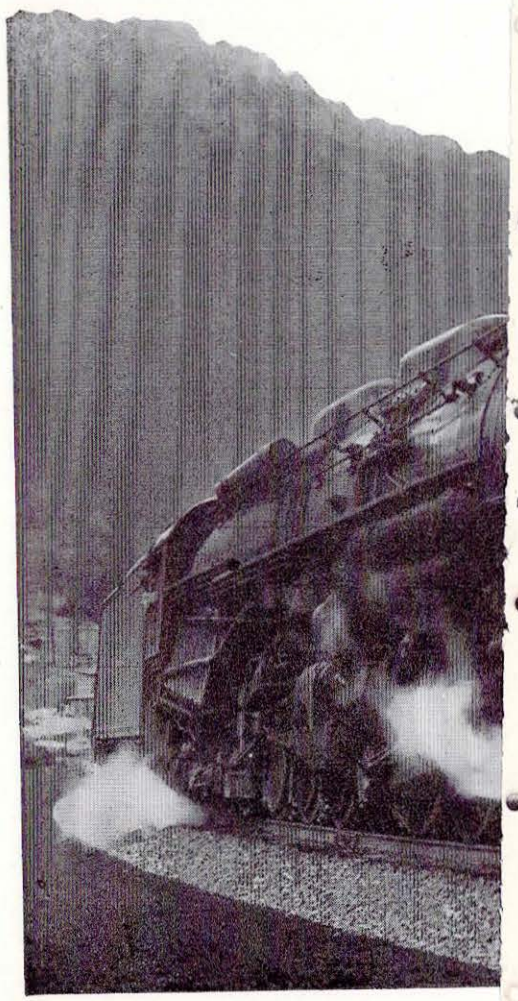

payment by the Kansas City Southern of a $50,000 fee to Kuhn, Loeb & Co. for advice and services in connection with a 1945 refunding program which involved the sale to that banking firm, as the only bidder, of $40,000,000 of first-mortgage, 30-year, 4 per cent bonds, and $6,000,000 of unsecured promissory notes.

Commissioner Mitchell, concurring in part, was in accord with the statement of future commission policy, but objected to that phase of the majority report which approved the Kuhn, Loeb fee. The majority, consisting of Commissioners Mahaffie and Miller, said that the agreement between the banking firm and the railroad was entered in good faith and that both considered the fee reasonable. The report also said that the evidence failed to show that the relationship of adviser, in this instance, gave Kuhn, Loeb an advantage over other prospective bidders for the issue.

In announcing its future policy the division majority had this to say: "Because of the possible adverse effects on the free marketing of securities inherent in the situation, we conclude and find that, aside from any question as to the propriety of a person's deriving a benefit from the sale of securities prepared under his direction as financial adviser for a fee, it is not in the public interest for such a person to participate in the bidding for the securities. This ruling will not be made retroactive. In the future, however, carriers, as defined in section 20a(1) of the Interstate Commerce Act, in devising and marketing their securities, and banking firms and other persons acting as advisers for a fee in devising and marketing such securities, will be expected to observe this ruling."

Previously the report had referred to a similar ruling made in July, 1945, by the Securities and Exchange Commission in *Western Light & Telephone Company*. The report was a supplemental one in Finance Docket No. 15076, the original report of November 23, 1945, having authorized the K.C.S. to sell the securities at the prices offered by Kuhn, Loeb and associates—98¼ for the bonds and par for the promissory notes (see *Railway Age* of December 1, 1945, page 917). At that time the division reserved jurisdiction as to the $50,000 fee, but thereafter took no action until the present report resulted from a September 3, 1948, petition wherein the road asked that payment of the fee be approved or that the reserved jurisdiction be released.

After reviewing this background of the case, the report pointed out that the commission regulations requiring the sale of railroad securities on the basis of competitive bidding permit the employment by railroads of financial advisers, and the payment thereto of a "reasonable fee" for advice and services. It then considered the services rendered by Kuhn, Loeb. Although that firm kept no record of the amount of time devoted to the matter by its partners and staff members, the evidence indicated that its advisory work included various conferences, among them discussions with a Dutch banking firm for which a Kuhn, Loeb partner made a trip to Holland. Also, it was noted that arrangements in connection with the fee made payment contingent upon successful consummation of the refunding plan. Moreover, there were other Kuhn, Loeb services, rendered in 1947, without additional fee, in connection with the retirement of a $14,000,000 note issue of the Louisiana & Arkansas, a subsidiary of the K.C.S.

The lone bid submitted for the K.C.S. bonds and promissory notes was the only response to invitations sent to 305 investment houses, insurance companies and other prospective purchasers. Associated with Kuhn, Loeb in making the bid were Ladenburk, Thalman & Co. and Blythe & Co., those three firms having acted as representatives of a 49-member syndicate. The commission calculated that Kuhn, Loeb's share of the net profits from the underwriting operation was $27,736.31. Meanwhile, it had noted that the subject of a Kuhn, Loeb bid had been discussed when arrangements for that firm's becoming financial adviser were being made; and "it was naturally understood," as the report put it, that in the event of a public offering Kuhn, Loeb would bid.

In approving the amount of the $50,000 fee as reasonable, the commission said it was not required to apply the same tests as must be applied in determining the compensation allowed attorneys and others in proceedings under section 77 of the Bankruptcy Act. "We recognize the fact that a fee paid for services rendered a carrier, for which the management is responsible only to the stockholders, might not be justified for the same services rendered a company in bankruptcy or reorganization," the report added. Thus the $50,000 was found "not unreasonable" in view of "the fact that the compensation was agreed upon with the understanding that it was to be payable only upon the successful conclusion of the financing program, the difficulties presented, and the results accomplished."

Commissioner Mitchell, in his concurring-in-part expression, said it was "not clearly shown" whether or not Kuhn, Loeb's position of financial adviser had given it information that other prospective bidders did not have. "They may," he added, "have had advance information as to the holders of the old bonds, the terms of the new securities and other pertinent facts which would have afforded them an advantage over other investment houses to organize a syndicate."

Mr. Mitchell also referred to Kuhn, Loeb's profit of $27,736.31 on the underwriting operation, and then went on to say: "Now, in addition to that, they ask $50,000 for their service as financial advisers, saying they have no record of time put in or work performed. I am opposed to the allowance of the $50,000 fee upon the record presented."

Burlington Seeks New Freight Route Between Kansas City and St. Louis

The Chicago, Burlington & Quincy has applied to the Interstate Commerce Commission for approval of trackage-rights arrangements whereby it would use about 158 miles of the Gulf, Mobile & Ohio system lines between Rock Creek Junction, Mo., and Francis, and thus establish an improved freight route between Kansas City and St. Louis. The lines are those of the Kansas City, St. Louis & Chicago which the G.M.&N. acpuired in connection with its acquisition of the Alton.

They were also involved in a previous application, denied by the commission wherein the Burlington sought approval of arrangements similar to those it now proposes and the Atchison, Topeka & Santa Fe sought to obtain a direct Kansas City-St. Louis line (see *Railway Age* of July 24, 1948, page 101). The Burlington's present proposal also contemplates acquisition of rights over 0.81 mile of track in the Kansas City terminal area where the K.C.St.L. & C. connects with the Kansas City Terminal.

The trackage rights would give the Burlington a 272-mile freight route between Kansas City and St. Louis, 66 miles shorter than its present route via Hanibal, Mo., and Cameron Junction. The fastest schedules it is now able to maintain "under most favorable conditions" between Kansas City and North St. Louis and East St. Louis are 13 hrs. and 14 hrs., respectively, the application said. The westbound schedule is now 19 hrs. 30 min. Over the proposed new route the Burlington contemplates the initial operation of two through freight trains in each direction daily—one on a 10-hour schedule in each direction, and the other on "somewhat slower" schedules.

In this connection, the applicant asserted that the road is "under practical necessity of improving its route, as its competitors have done, if it is to remain a factor in handling competitive traffic and is to provide adequate service to the public." Meanwhile, the proposal involves no undertaking to change the Burlington's passenger services between St. Louis and Kansas City.

Competition for passenger business between those two points "is very keen," the application said. "Neither the applicant nor the G.M.&O.," it added, "can see its way clear under existing conditions, to make the rather heavy investment required to place the line between Francis and Rock Creek Junction in condition for high-speed service by modern passenger trains, equal in all respects to those operated by competing routes; or to make the expenditures

necessary to purchase such trains." On the other hand, both roads believe that the route "can, with moderate expenditures, be made an excellent route for the movement of through freight." The Burlington's present passenger-service route between St. Louis and Kansas City (via Old Monroe, Francis, Mexico and Slater) is about the same length as the proposed new freight route; but the application said that attempts to operate freight service over that line have been "unsatisfactory."

The new route would include that part of the Burlington's present St. Louis-Kansas City freight route between St. Louis and the connection at Francis with the K.C.St.L. & C. tracks. The proposed trackage-rights agreement would be on a "joint-facility" basis, with the Burlington paying as rental 50 per cent of the interest on K.C.St.L. & C. bonds and 50 per cent of the ad valorem and franchise taxes applicable to the line. Maintenance and operating expenses would be divided on the basis of car-mile use of the line, the Burlington's share to be computed on the basis of actual use, subject to a minimum of 30 per cent.

New Securities

Division 4 of the Interstate Commerce Commission has **authorized:**

New York Central.—To assume liability for $9,720,000 of equipment trust certificates to finance in part the acquisition of 12 Diesel-electric locomotives, 54 passenger cars and 1,000 freight cars at a total estimated cost of $13,338,000 (see *Railway Age* of December 4, 1948, page 70). The commission's report approved a selling price of 99.29 for the issue with a 2⅝ per cent interest rate and a 15-year term—the bid of Halsey, Stuart & Co., and associates, which had been accepted subject to commission approval. On that basis the average annual interest cost will be approximately 2.75 per cent. Bids had been invited on the basis of a 10-year as well as a 15-year term for the issue, and there, too, Halsey, Stuart and associates submitted the low bid—the same 99.29 that they offered on the 15-year basis, but a lower interest rate, 2⅜ per cent as compared with 2⅝ per cent. Explaining N.Y.C.'s decision to accept the 15-year-basis bid, the report said that the choice was based on a desire to spread the maturities over a longer period in view of the "heavy maturities" of other N.Y.C. equipment obligations during the next 10 years. The certificates will be dated January 1, and will mature in 15 annual installments of $648,000 each, beginning January 1, 1950. The certificates were reoffered to the public at prices yielding from 1.55 per cent to 2.9 per cent, according to maturity.

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H. G. Powell, vice-president and treasurer of the Illinois Terminal at St. Louis, Mo., resigned from those positions effective on December 31, 1948, and was subsequently appointed executive representative to the president. **William M. Long,** assistant vice-president—traffic, has been elected vice-president—traffic.

William C. Douglas, assistant vice-president—freight traffic of the New York Central System, at Chicago, has retired following 53 years of service with the railroad. **David S. Mackie,** freight traffic manager at Chicago, will assume Mr. Douglas' former duties.

Richard E. Dougherty, vice-president—assistant to president of the New York Central system at New York, retired on December 31, 1948, after more than 46 years of service. Through an appointment as advisory consultant, Mr. Dougherty's services will remain available to the railroad. He has been succeeded as vice-president by **Boynton S. Voorhees,** assistant vice-president.

Mr. Dougherty's career with the New York Central covers a span of years during which he directed many major engineering improvements and developments on the road. These included the Park Avenue and West Side improvements in New York, the Cleveland Union Terminal, the Buffalo Central Terminal, and numerous roadway improvement and bridge construction projects. For many years he has also exercised supervision over the New York Central's important real estate holdings in the Grand Central terminal area, including hotels, apartment houses and office buildings, and has been an officer and director in many of the N.Y.C.'s subsidiary corporations.

Born in New York in 1880, Mr. Dougherty attended the College of the City of New York and is a graduate of Columbia University, with a degree in civil engineering. After a year as an instructor in the Department of Engineering at Columbia, he joined the

Richard E. Dougherty

N.Y.C. in 1902 at Schenectady, N. Y., and Albany, as a rodman, inspector, transitman and assistant engineer. In 1904 he was transferred to New York City as assistant engineer and in 1905 he became resident engineer. Two years later Mr. Dougherty was appointed assistant district engineer and in 1910 became district engineer in charge of construction in the road's Eastern district, including New York and New York harbor and the Hudson, Harlem, and Putnam division. Eight years later he was appointed designing engineer for the territory Buffalo and East. In 1924 he became engineering assistant to president; on February 1, 1930, vice-president, improvements and development of the system; and on September 1, 1947, vice-president—assistant to president. Mr. Dougherty is president of the American Society of Civil Engineers.

Mr. Voorhees was graduated from the Sheffield Scientific School of Yale University in 1907. After one year of service with the New York, New Haven & Hartford he entered the employ of the New York Central as rodman. He was appointed assistant engineer, grade crossings, in 1912; engineer of grade crossings in 1916; district engineer of the Eastern division in 1920; general office engineer in 1920; and engineering assistant to vice-president, improvements and development, in 1924. Mr. Voorhees became assistant vice-president in 1942, which position he held until his recent promotion to vice-president.

Boynton S. Voorhees

FINANCIAL, LEGAL and ACCOUNTING

H. M. Blaiklock, acting regional manager of real estate of the Canadian National, has been appointed assistant regional manager of real estate of the Central region at Toronto, Ont.

Edward T. Reidy, whose appointment as secretary of the Chicago Great Western at Chicago, was reported in the *Railway Age* of December 18, 1948, was born in Chicago on April 4, 1903, and attended high school and De Paul University in that city. He entered railway service with the C. G. W. on August 26, 1926, as a clerk in the superintendent's office at Chicago. In December, 1929, he was advanced to secretary to the operating vice-president, and in July, 1933, he was appointed secretary to the president. Mr. Reidy became assistant secretary of the C. G. W. in February, 1941, and was serving in this position at the time of his appointment as secretary.

L. D. Phelan, assistant general adjuster of the Chicago, Milwaukee, St. Paul & Pacific at Chicago, has been appointed general adjuster at that point, succeeding **A. W. Bigham,** whose death was reported in the *Railway Age* of December 18, 1948.

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payment by the Kansas City Southern of a $50,000 fee to Kuhn, Loeb & Co. for advice and services in connection with a 1945 refunding program which involved the sale to that banking firm, as the only bidder, of $40,000,000 of first-mortgage, 30-year, 4 per cent bonds, and $6,000,000 of unsecured promissory notes.

Commissioner Mitchell, concurring in part, was in accord with the statement of future commission policy, but objected to that phase of the majority report which approved the Kuhn, Loeb fee. The majority, consisting of Commissioners Mahaffie and Miller, said that the agreement between the banking firm and the railroad was entered in good faith and that both considered the fee reasonable. The report also said that the evidence failed to show that the relationship of adviser, in this instance, gave Kuhn, Loeb an advantage over other prospective bidders for the issue.

In announcing its future policy the division majority had this to say: "Because of the possible adverse effects on the free marketing of securities inherent in the situation, we conclude and find that, aside from any question as to the propriety of a person's deriving a benefit from the sale of securities prepared under his direction as financial adviser for a fee, it is not in the public interest for such a person to participate in the bidding for the securities. This ruling will not be made retroactive. In the future, however, carriers, as defined in section 20a(1) of the Interstate Commerce Act, in devising and marketing their securities, and banking firms and other persons acting as advisers for a fee in devising and marketing such securities, will be expected to observe this ruling."

Previously the report had referred to a similar ruling made in July, 1945, by the Securities and Exchange Commission in *Western Light & Telephone Company*. The report was a supplemental one in Finance Docket No. 15076, the original report of November 23, 1945, having authorized the K.C.S. to sell the securities at the prices offered by Kuhn, Loeb and associates—98¼ for the bonds and par for the promissory notes (see *Railway Age* of December 1, 1945, page 917). At that time the division reserved jurisdiction as to the $50,000 fee, but thereafter took no action until the present report resulted from a September 3, 1948, petition wherein the road asked that payment of the fee be approved or that the reserved jurisdiction be released.

After reviewing this background of the case, the report pointed out that the commission regulations requiring the sale of railroad securities on the basis of competitive bidding permit the employment by railroads of financial advisers, and the payment thereto of a "reasonable fee" for advice and services. It then considered the services rendered by Kuhn, Loeb. Although that firm kept no record of the amount of time devoted to the matter by its partners and staff members, the evidence indicated that its advisory work included various conferences, among them discussions with a Dutch banking firm for which a Kuhn, Loeb partner made a trip to Holland. Also, it was noted that arrangements in connection with the fee made payment contingent upon successful consummation of the refunding plan. Moreover, there were other Kuhn, Loeb services, rendered in 1947, without additional fee, in connection with the retirement of a $14,000,000 note issue of the Louisiana & Arkansas, a subsidiary of the K.C.S.

The lone bid submitted for the K.C.S. bonds and promissory notes was the only response to invitations sent to 305 investment houses, insurance companies and other prospective purchasers. Associated with Kuhn, Loeb in making the bid were Ladenburk, Thalman & Co. and Blythe & Co., those three firms having acted as representatives of a 49-member syndicate. The commission calculated that Kuhn, Loeb's share of the net profits from the underwriting operation was $27,736.31. Meanwhile, it had noted that the subject of a Kuhn, Loeb bid had been discussed when arrangements for that firm's becoming financial adviser were being made; and "it was naturally understood," as the report put it, that in the event of a public offering Kuhn, Loeb would bid.

In approving the amount of the $50,000 fee as reasonable, the commission said it was not required to apply the same tests as must be applied in determining the compensation allowed attorneys and others in proceedings under section 77 of the Bankruptcy Act. "We recognize the fact that a fee paid for services rendered a carrier, for which the management is responsible only to the stockholders, might not be justified for the same services rendered a company in bankruptcy or reorganization," the report added. Thus the $50,000 was found "not unreasonable" in view of "the fact that the compensation was agreed upon with the understanding that it was to be payable only upon the successful conclusion of the financing program, the difficulties presented, and the results accomplished."

Commissioner Mitchell, in his concurring-in-part expression, said it was "not clearly shown" whether or not Kuhn, Loeb's position of financial adviser had given it information that other prospective bidders did not have. "They may," he added, "have had advance information as to the holders of the old bonds, the terms of the new securities and other pertinent facts which would have afforded them an advantage over other investment houses to organize a syndicate."

Mr. Mitchell also referred to Kuhn, Loeb's profit of $27,736.31 on the underwriting operation, and then went on to say: "Now, in addition to that, they ask $50,000 for their service as financial advisers, saying they have no record of time put in or work performed. I am opposed to the allowance of the $50,000 fee upon the record presented."

Burlington Seeks New Freight Route Between Kansas City and St. Louis

The Chicago, Burlington & Quincy has applied to the Interstate Commerce Commission for approval of trackage-rights arrangements whereby it would use about 158 miles of the Gulf, Mobile & Ohio system lines between Rock Creek Junction, Mo., and Francis, and thus establish an improved freight route between Kansas City and St. Louis. The lines are those of the Kansas City, St. Louis & Chicago which the G.M. &N. acquired in connection with its acquisition of the Alton.

They were also involved in a previous application, denied by the commission wherein the Burlington sought approval of arrangements similar to those it now proposes and the Atchison, Topeka & Santa Fe sought to obtain a direct Kansas City-St. Louis line (see *Railway Age* of July 24, 1948, page 101). The Burlington's present proposal also contemplates acquisition of rights over 0.81 mile of track in the Kansas City terminal area where the K.C.St.L. & C. connects with the Kansas City Terminal.

The trackage rights would give the Burlington a 272-mile freight route between Kansas City and St. Louis, 66 miles shorter than its present route via Hanibal, Mo., and Cameron Junction. The fastest schedules it is now able to maintain "under most favorable conditions" between Kansas City and North St. Louis and East St. Louis are 13 hrs. and 14 hrs., respectively, the application said. The westbound schedule is now 19 hrs. 30 min. Over the proposed new route the Burlington contemplates the initial operation of two through freight trains in each direction daily—one on a 10-hour schedule in each direction, and the other on "somewhat slower" schedules.

In this connection, the applicant asserted that the road is "under practical necessity of improving its route, as its competitors have done, if it is to remain a factor in handling competitive traffic and is to provide adequate service to the public." Meanwhile, the proposal involves no undertaking to change the Burlington's passenger services between St. Louis and Kansas City.

Competition for passenger business between those two points "is very keen," the application said. "Neither the applicant nor the G.M.&O.," it added, "can see its way clear under existing conditions, to make the rather heavy investment required to place the line between Francis and Rock Creek Junction in condition for high-speed service by modern passenger trains, equal in all respects to those operated by competing routes; or to make the expenditures

necessary to purchase such trains." On the other hand, both roads believe that the route "can, with moderate expenditures, be made an excellent route for the movement of through freight." The Burlington's present passenger-service route between St. Louis and Kansas City (via Old Monroe, Francis, Mexico and Slater) is about the same length as the proposed new freight route; but the application said that attempts to operate freight service over that line have been "unsatisfactory."

The new route would include that part of the Burlington's present St. Louis-Kansas City freight route between St. Louis and the connection at Francis with the K.C.St.L. & C. tracks. The proposed trackage-rights agreement would be on a "joint-facility" basis, with the Burlington paying as rental 50 per cent of the interest on K.C.St.L. & C. bonds and 50 per cent of the ad valorem and franchise taxes applicable to the line. Maintenance and operating expenses would be divided on the basis of car-mile use of the line, the Burlington's share to be computed on the basis of actual use, subject to a minimum of 30 per cent.

New Securities

Division 4 of the Interstate Commerce Commission has **authorized:**

New York Central.—To assume liability for $9,720,000 of equipment trust certificates to finance in part the acquisition of 12 Diesel-electric locomotives, 54 passenger cars and 1,000 freight cars at a total estimated cost of $13,338,000 (see *Railway Age* of December 4, 1948, page 70). The commission's report approved a selling price of 99.29 for the issue with a 2⅝ per cent interest rate and a 15-year term—the bid of Halsey, Stuart & Co., and associates, which had been accepted subject to commission approval. On that basis the average annual interest cost will be approximately 2.75 per cent. Bids had been invited on the basis of a 10-year as well as a 15-year term for the issue, and there, too, Halsey, Stuart and associates submitted the low bid—the same 99.29 that they offered on the 15-year basis, but a lower interest rate, 2⅜ per cent as compared with 2⅝ per cent. Explaining N.Y.C.'s decision to accept the 15-year-basis bid, the report said that the choice was based on a desire to spread the maturities over a longer period in view of the "heavy maturities" of other N.Y.C. equipment obligations during the next 10 years. The certificates will be dated January 1, and will mature in 15 annual installments of $648,000 each, beginning January 1, 1950. The certificates were reoffered to the public at prices yielding from 1.55 per cent to 2.9 per cent, according to maturity.

Seaboard Air Line.—To assume liability for $3,255,000 of equipment trust certificates, series E, to finance in part the acquisition of nine Diesel-electric locomotives and 450 freight cars at a total estimated cost of $4,359,741 (see *Railway Age* of November 27, 1948, page 52). The certificates will be dated January 1, and will mature in 15 annual installments of $217,000 each, beginning January 1, 1950. The commission's report approved a selling price of 99.163 for the issue with a 2½ per cent interest rate—the bid of Salomon Bros. & Hutzler and associates which will make the average annual interest cost approximately 2.63 per cent. The certificates were reoffered to the public at prices yielding from 1.5 per cent to 2.8 per cent, according to maturity.

Southern Pacific.—To assume liability for $15,740,000 of equipment trust certificates, series Z, to finance in part the acquisition of 42 Diesel-electric locomotives, 52 lightweight passenger-train cars and 1,300 freight cars at a total estimated cost of $23,621,757 (see *Railway Age* of December 4, 1948, page 70). The certificates will be dated January 1, and will mature in 10 annual installments of $1,574,000 each, beginning January 1, 1950. The commission's report also approved a selling price of 99.06991 for the issue with a 2⅛ per cent interest rate—the bid of Halsey, Stuart & Co., and associates, which will make the average annual interest cost approximately 2.33 per cent. The certificates were reoffered to the public at prices yielding from 1.45 per cent to 2.45 per cent, according to maturity.

Application has been filed with the I.C.C. by: **Chesapeake & Ohio.**—To assume liability for $7,000,000 of equipment trust certificates to finance in part the acquisition of 8 Diesel-electric locomotives and 1,675 freight cars. The Diesels will be 1,500-hp. road switching locomotives, purchased from the Electro-Motive Division of the General Motors Corporation—3 at $169,978.7. each and 5 at 7161,413.74 each. The freight cars will be 70-ton hoppers of all-steel construction; 1,000 will be purchased from the American Car & Foundry Co. at a unit price of $4,350, and 675 from the Bethlehem Steel Company at a unit price of $4,627.30. The certificates would be dated January 15 and would mature in 10 annual installments of $700,000 each, beginning Jauary 15, 1950. They would be sold on the basis of competitive bids with the interest rate specified in such bids.

Dividends Declared

Lake Superior & Ishpeming.—(year-end), 25¢, payable January 21 to holders of record January 14.

New London Northern.—$1.75, quarterly, payable December 27, 1948, to holders of record December 15, 1948.

New York, Chicago & St. Louis.—6% preferred A (accum.) $7.50, payable March 15 to holders of record February 25.

Norfolk & Western.—4% adjustment preferred, 25¢, quarterly, payable February 10 to holders of record January 19.

Northern Central.—$2.00, semi-annually, payable January 15 to holders of record December 31, 1948.

Stony Brook.—$2.50, semi-annually; extra, 50¢, both payable January 5 to holders of record December 31, 1948.

Wabash.—(year-end) $1.50, payable December 24, 1948, to holders of record December 10, 1948.

Wheeling & Lake Erie.—4% prior lien, $1.00, quarterly, payable February 1 to holders of record January 21.

Average Prices Stocks and Bonds

	Dec. 27	Last week	Last year
Average price of 20 representative railway stocks	43.39	43.17	49.45
Average price of 20 representative railway bonds	88.35	87.75	85.91

EQUIPMENT AND SUPPLIES

FREIGHT CARS

The **Reading** has ordered 750 50-ton hopper cars costing about $3,200,000 from the Bethlehem Steel Company. Delivery of the cars, to be built at Johnstown, Pa., is scheduled to begin next June.

LOCOMOTIVES

The **India Supply Mission** has ordered 140 steam locomotives from the Baldwin Locomotive Works. The locomotives, 120 of which will be of the 2-8-2 type for freight service and 20 of which will be of the 4-6-2 type for passenger service, are for meter (3 ft. 3⅜ in.) gage track. Delivery will start about mid-1949 and is scheduled for completion by the end of the year.

SIGNALING

The **Missouri Pacific** has ordered equipment from the General Railway Signal Company for the control of two switch machines and five signals at a lap siding in centralized traffic territory at Reily Lake, Ill. This project involves the addition of a 10-in. section to the control machine at Chester, Ill., as well as replacement of two of the existing panel sections. This order also includes Model 5D dual-control electric switch machines, Type K relays, and a 6- by 8-ft. welded steel relay housing.

The **Louisville & Nashville** has ordered materials from the General Railway Signal Company for extension of existing centralized traffic control facilities between Irvine, Ky., and Perritt, 80 mi., on to Blackey, Ky., an additional 28.9 mi. Facilities from Typo to Blackey will be controlled by carrier, with the carrier converter unit at Typo. This will involve the addition of 27 levers and 39 track indication lights to the control machine at Ravenna for the added facilities: 10 switch machines, 29 switch locks, and 48 signals. A unit-wire all-relay electric interlocking at Hazard, Ky., will be included in this order. The 19- by 37-in. control panel, to be located in the yard office at Hazard, will have 12 track indication lights and 13 levers for the control of a switch machine, 17 switch locks, and 13 signals. Control of some of these facilities will be shared with the Ravenna machine. Model 5D dual-control electric switch machines, Type SA Searchlight signals, Type K relays, welded steel housings and Model 9A electric switch locks are included in this order.

The **Wisconsin Central** has ordered materials from the General Railway Sig-

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a unit of POWER

THIS locomotive is a unit of power. It illustrates a significant fact. Where the amount of power that can be packed into a single unit is important—where you want 6000, 8000, even 10,000 horsepower in one engine—the steam locomotive is unchallenged.

We build such locomotives — steam locomotives like this that have developed 8,000 horsepower and can do more. We will continue to do so. They are fine pieces of machinery. Modern in every respect, they are establishing remarkable records for economy, reliability and low maintenance.

Don't sell these steam giants short. They have their place—and in their place are unsurpassed.

LIMA HAMILTON CORPORATION

DIVISIONS: *Lima, Ohio* — Lima Locomotive Works Division; Lima Shovel and Crane Division. *Hamilton, Ohio* — Hooven, Owens, Rentschler Co.; Niles Tool Works Co.

PRINCIPAL PRODUCTS: Locomotives; Cranes and shovels; Niles heavy machine tools; Hamilton diesel and steam engines; Hamilton heavy metal stamping presses; Hamilton-Kruse automatic can-making machinery; Special heavy machinery; Heavy iron castings; Weldments.

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Tending Strictly to YOUR *Business*

Maybe you didn't recognize it at first . . . but the picture shows a segment of a very important division of your business!

The complete division represents an investment of over 20 billion dollars. It operates over 200 thousand miles of railroad line. It utilizes almost 2 million items of rolling stock, comprising over 40 types of cars, and a dozen types of locomotives for a dozen basic assignments—each specialized to tend to *your* business better.

Such a variety of equipment naturally calls for a variety of brakes—and the research and development program of Westinghouse Air Brake Company has always had them ready when the need arose. The widely differing requirements imposed by a "streamliner" and the heavy tonnage freight train are efficiently met by modern Westinghouse Air Brakes.

Railroad history is a history of continuing progress. You can be sure that tomorrow's trains will offer you something more in benefits—and that Westinghouse Air Brakes will contribute to the smoothness and safety of any journey that you and your products make.

Westinghouse Air Brake Co.

WILMERDING, PA.

To Direct popular attention to the remarkable achievements of American Railroads, this advertisement has been run in national media by Westinghouse Air Brake Co.

OPERATING

William G. White, superintendent of the Delaware, Lackawanna & Western at Hoboken, N. J., has been promoted to general superintendent, with headquarters at New York. **Fred Diegtel,** superintendent at Scranton, Pa., has been transferred to Hoboken, to succeed Mr. White. **J. A. Craddock,** assistant superintendent at Scranton, has been promoted to superintendent there.

H. H. Hill, general roadmaster of the Atlantic Coast Line at Rocky Mount, N. C., has been appointed superintendent of the Richmond district, with the same headquarters, succeeding **R. G. Murchison,** who has been appointed superintendent, terminals, at Richmond, Va.

TRAFFIC

George O. Davis has been appointed general agent of the Atlantic Coast Line at Cleveland, Ohio.

B. W. Hanson, traffic manager of the Union Pacific at Salt Lake City, Utah, has been advanced to manager of industrial development for the railroad in the states of Utah, Idaho, Colorado, Wyoming and Montana, with headquarters at that point. **J. W. Padden,** assistant traffic manager at Los Angeles, Cal., has been promoted to traffic manager, succeeding Mr. Hanson. **G. F. Allen,** general agent in the freight department at San Francisco, Cal., has been appointed to take Mr. Padden's place, and he is in turn succeeded by **B. P. Costello,** general agent at Tacoma, Wash. **F. G. Rothwell,** traveling freight agent at Denver, Colo., has replaced Mr. Costello.

John B. Green has been appointed general traffic manager of the Litchfield & Madison, with headquarters at St. Louis, Mo., succeeding **Alfred B. Smith,** who has been elected vice-president of traffic at Chicago.

John J. Duggan, station baggage master of the New York Central at Grand Central terminal, New York, has been appointed general baggage agent there.

F. H. Rockwell, acting general freight traffic manager of the Atchison, Topeka & Santa Fe at Chicago, has been appointed general freight traffic manager at that point, succeeding **T. L. Bothwell,** who has retired.

Arthur C. Stenberg, whose appointment as general traffic manager of the Duluth, South Shore & Atlantic at Marquette, Mich., was reported in the *Railway Age* of December 25, 1948, was born on November 28, 1897, at Duluth, Minn., and entered railway service there on October 15, 1913, as a clerk in the general traffic department of the D. S. S. & A. He later became chief clerk to the traffic manager and to the general freight agent at that point. In April, 1929, he was advanced to general agent at Spokane, Wash., subsequently becoming district freight agent there in September, 1939. He was appointed general western freight agent at Seattle, Wash., in November, 1944, and in September of the next year he was made assistant traffic manager at Marquette. Mr. Stenberg was promoted to traffic manager at that point in January, 1946, and was serving in this position at the time of his recent appointment as general traffic manager.

T. B. Duggan, freight traffic manager in charge of rates and divisions for the Missouri Pacific Lines at St. Louis, Mo., has retired after 50 years of service with that company. He is succeeded by **J. S. Smith,** assistant freight traffic manager at St. Louis, whose photograph and biographical sketch appeared in the *Railway Age* of August 21, 1948, in connection with his promotion to assistant freight traffic manager.

MECHANICAL

Reginald Ambrose, superintendent of car equipment of the Atlantic region of the Canadian National at Moncton, N. B., has retired after more than 51 years of railroad work. Born in England, Mr. Ambrose began his career as a coach building apprentice on the Lancashire & Yorkshire (England) in 1897, and subsequently held numerous mechanical positions on six leading railroads in Great Britain. He completed an eight-year apprenticeship and served as car builder, pattern and template maker, carpenter, cabinet maker and draughtsman. Mr. Ambrose worked on railway car construction across Canada from New Westminster, B. C., to Halifax, N. S., where he was employed by the Silliker Car Company. He joined the Intercolonial (now C.N.R.) as draughtsman at Moncton in 1911, and in 1917 was promoted to car chargehand and draughtsman. In 1929 Mr. Ambrose became chief draughtsman, car department, C.N.R., and four years later was appointed assistant superintendent of car equipment, becoming superintendent of car equipment for the Atlantic region in 1944.

PURCHASES and STORES

M. E. Towner, general purchasing agent of the Western Maryland at Baltimore, Md., has retired after 48 years of active railroad service.

J. H. Lauderdale, general purchasing agent of the Missouri Pacific Lines at St. Louis, Mo., has retired after 15 years in that post. He is succeeded by **A. A. Taylor,** assistant general purchasing agent, who in turn is replaced by **W. R. H. Mau,** purchasing agent at Houston, Tex.

ENGINEERING and SIGNALING

Robert C. Caldwell has been appointed chief engineer of the Jacksonville Terminal at Jacksonville, Fla., succeeding the late **Harold D. Van Vranken.**

C. W. Breed, engineer of standards for the Chicago, Burlington & Quincy, Chicago, has retired following 50 years of railroad service. Born on December 17, 1878, at Quincy, Ill., Mr. Breed received his technical education at Armour Institute and joined the Burlington in 1898 to work on track elevation. Except for two years of army duty during World War I and two years' service with the Chicago Car Service Association, Mr. Breed's entire career has been spent with the Burlington. He served successively as rodman, draftsman, chief draftsman, officer engineer and engineer of standards, having held the latter post since February 1, 1943.

C. Meyers, supervisor of telegraph and signals of the Central region of the Pennsylvania at Pittsburgh, Pa., has been transferred to the Long Island at Jamaica, N. Y.

SPECIAL

Roy A. Mackie, assistant general manager of hotels of the Canadian Pacific, has been promoted to general manager of hotels, with headquarters as before at Montreal, Que., succeeding **H. F. Mathews,** who has retired under the pension rules, after more than 50 years with the C.P.R.

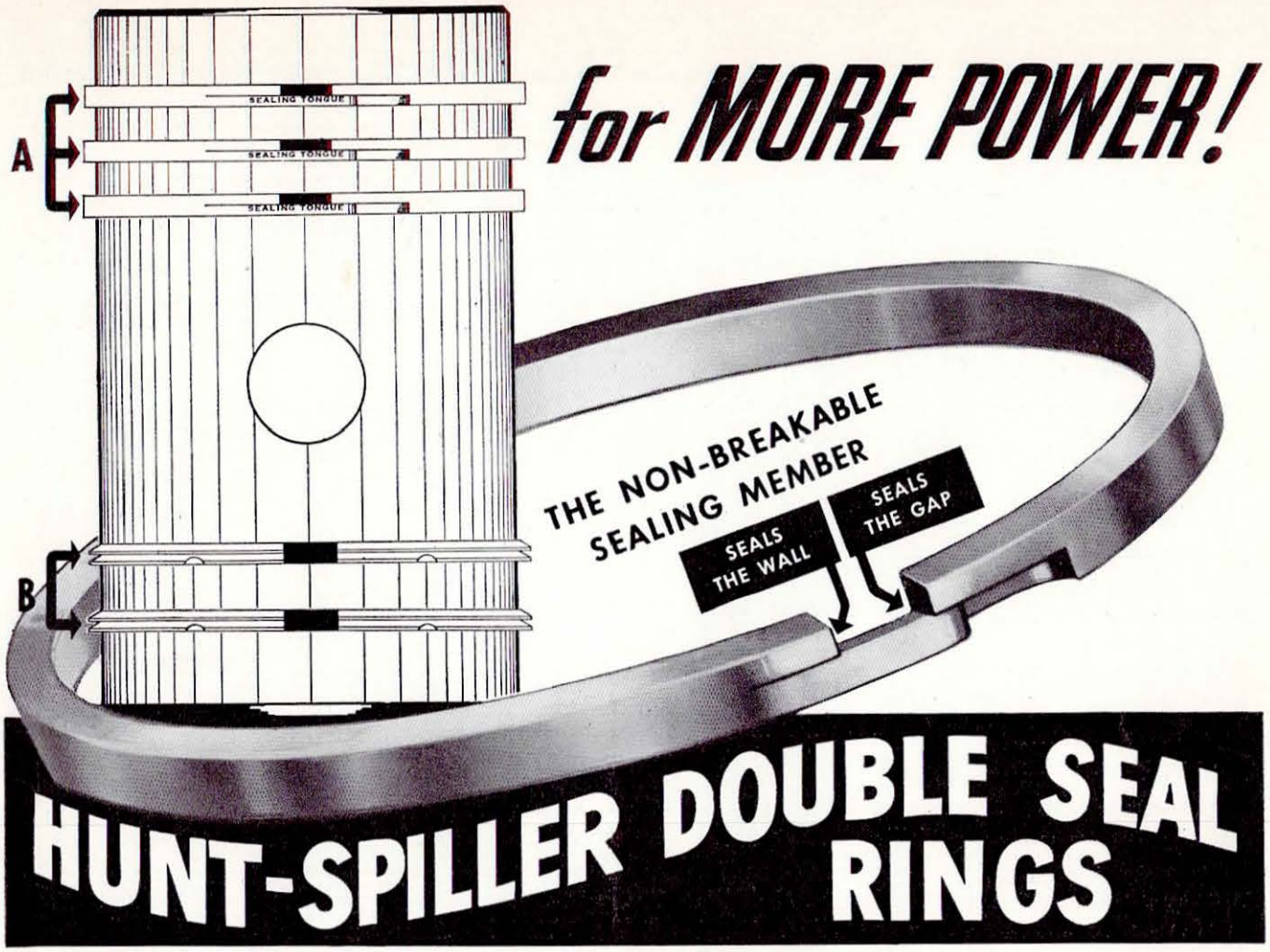
OBITUARY

Harold D. Van Vranken, chief engineer of the Jacksonville Terminal at Jacksonville, Fla., died recently of a heart attack.

T. A. Graham, general auditor of the Chicago, Rock Island & Pacific at Chicago, died on December 18, 1948, of a heart attack at his home in that city.

George R. Newton, general agent of the Atlantic Coast Line at Rochester, N. Y., since June 1, 1907, died on December 17.

R. O. Davis, superintendent of terminals for the St. Louis-San Francisco at St. Louis, Mo., whose death was reported in the *Railway Age* of December 18, 1948, was born at Springfield, Mo., on September 18, 1891, and attended high school in that city. He entered railway service in 1908 as a caller for the Frisco, becoming a yard clerk in 1909, and subsequently serving as a tracer clerk in the office of the superintendent of transportation. In 1911 he became a brakeman on the eastern division of the Frisco, and in 1916 a conductor on the same division. He was advanced to yardmaster at Monett, Mo., in 1929, and in August, 1934, he was appointed terminal trainmaster at St. Louis. Mr. Davis was promoted to superintendent of terminals at that point in December, 1940, which position he held at the time of his death.



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Freight Operating Statistics of Large Steam Railways—Selected

	Region, road and year	Miles of road operated	Locomotive miles: Train-miles	Locomotive miles: Principal and helper	Locomotive miles: Light	Car-miles: Loaded (*thousands*)	Car-miles: Per cent loaded	Ton-miles (*thousands*): Gross excl. locos. & tenders	Ton-miles (*thousands*): Net rev. and non-rev.	Road locos. on line: Serviceable: Unstored	Road locos. on line: Serviceable: Stored	Road locos. on line: B.O.	Road locos. on line: Percent B.O.
New Eng. Region	Boston & Albany	1948 362	114,917	120,560	11,994	2,971	61.9	197,247	81,251	49	4	28	34.6
		1947 362	143,603	158,813	25,346	3,410	65.4	223,430	96,622	66	2	25	26.9
	Boston & Maine	1948 1,746	295,112	304,963	15,537	10,730	72.0	663,023	295,951	93	2	21	18.1
		1947 1,746	308,769	318,324	13,670	11,611	74.5	695,145	311,443	103	4	13	10.8
	N. Y., N. H. & Htfd	1948 1,778	319,224	610,325	42,654	12,644	71.4	763,896	347,169	175	16	32	14.4
		1947 1,820	339,582	564,045	58,271	13,039	72.6	776,745	354,836	228	5	22	14.7
Great Lakes Region	Delaware & Hudson	1948 794	277,020	334,997	34,958	11,864	69.4	854,900	468,627	123	28	33	17.9
		1947 794	276,687	332,839	32,360	12,241	74.1	846,234	472,748	126	32	26	14.1
	Del., Lack. & Western	1948 970	293,859	325,515	35,606	13,001	72.5	850,233	408,990	109	25	16	10.7
		1947 970	324,206	369,314	46,546	14,207	71.0	932,428	437,885	116	12	15	10.5
	Erie	1948 2,229	670,448	707,619	56,958	36,741	68.4	2,362,766	1,003,143	239	53	74	20.2
		1947 2,229	793,899	848,374	62,797	38,481	65.8	2,532,627	1,045,653	270	14	87	23.5
	Grand Trunk Western	1948 972	270,941	278,069	2,605	8,911	66.9	591,396	269,462	66	3	9	11.5
		1947 972	290,241	294,948	2,759	9,431	68.4	601,008	265,210	65	..	7	9.7
	Lehigh Valley	1948 1,239	299,371	334,484	37,403	12,935	73.1	862,758	442,086	89	3	21	18.6
		1947 1,239	322,227	358,466	58,336	14,144	70.1	967,293	482,353	96	11	61	36.3
	New York Central	1948 10,339	3,141,803	3,351,046	225,543	113,718	64.9	7,918,079	3,786,544	1,043	87	284	20.1
		1947 10,338	3,217,255	3,443,605	232,563	118,773	66.0	8,010,052	3,756,926	1,017	48	310	22.5
	New York, Chic. & St. L.	1948 1,656	581,505	588,190	7,546	24,210	72.4	1,514,932	691,233	139	16	18	10.4
		1947 1,656	625,728	632,057	8,558	25,187	68.6	1,612,232	707,815	147	2	16	9.7
	Pitts. & Lake Erie	1948 223	89,913	91,537	523	4,098	70.0	337,113	204,114	37	3	12	23.1
		1947 223	97,668	98,780	74	3,967	67.8	328,889	195,996	33	2	15	30.0
	Wabash	1948 2,381	649,689	664,402	15,744	23,001	72.2	1,450,378	642,466	156	9	38	18.7
		1947 2,381	647,263	662,725	15,944	23,855	73.6	1,478,903	661,314	159	10	34	16.7
Central Eastern Region	Baltimore & Ohio	1948 6,076	1,886,236	2,365,266	261,454	69,128	66.0	5,065,126	2,584,949	860	33	188	17.4
		1947 6,100	1,982,701	2,471,822	280,529	71,279	65.5	5,142,327	2,585,317	825	24	294	25.7
	Central of New Jersey*	1948 417	77,117	78,964	6,898	3,175	67.1	235,748	125,102	44	..	20	31.3
		1947 418	79,427	83,747	9,336	3,192	67.4	226,286	121,107	46	..	23	33.3
	Central of Pennsylvania	1948 213	81,247	89,766	14,551	3,089	70.4	227,468	126,755	39	4	12	21.8
		1947 213	77,291	88,668	16,997	3,054	70.0	214,325	118,937	44	3	18	27.7
	Chicago & Eastern Ill.	1948 909	154,117	154,811	4,500	5,346	69.2	359,408	174,580	48	4	18	25.7
		1947 910	173,232	173,958	3,670	5,476	71.2	357,150	176,632	58	..	15	20.5
	Elgin, Joliet & Eastern	1948 238	96,051	96,683	.....	3,474	69.1	265,998	147,512	35	8	1	2.3
		1947 391	117,310	121,818	3,788	3,653	69.5	277,171	153,351	42	11	8	13.1
	Pennsylvania System	1948 10,023	3,623,967	4,058,647	502,327	148,483	66.2	10,590,757	5,340,311	1,774	41	247	12.0
		1947 10,031	3,873,988	4,402,973	614,715	156,945	68.8	10,905,369	5,561,582	1,906	31	271	12.3
	Reading	1948 1,337	434,680	461,681	47,642	16,543	67.5	1,289,585	723,470	192	25	37	14.6
		1947 1,356	436,703	480,390	57,609	16,522	68.8	1,233,249	686,632	216	30	34	12.1
	Western Maryland	1948 837	209,470	259,813	39,484	7,641	61.5	636,201	351,627	156	5	15	8.5
		1947 837	224,954	274,823	39,441	7,837	62.9	657,448	367,249	156	4	14	8.0
Pocahontas Region	Chesapeake & Ohio	1948 5,003	1,642,637	1,759,609	74,120	70,736	58.8	5,952,329	3,397,652	607	5	92	13.1
		1947 4,979	1,708,831	1,816,928	80,325	74,512	57.5	6,333,544	3,550,476	625	5	79	11.1
	Norfolk & Western	1948 2,107	829,376	883,571	60,318	38,143	58.7	3,345,481	1,850,918	275	24	21	6.6
		1947 2,108	809,479	863,873	64,949	37,330	59.1	3,254,513	1,800,508	262	30	21	6.7
	Atlantic Coast Line	1948 5,549	838,430	856,912	13,933	20,993	66.7	1,403,605	657,786	337	17	78	18.1
		1947 5,556	783,569	799,390	11,846	21,390	67.4	1,397,115	647,181	337	43	50	11.6
Southern Region	Central of Georgia	1948 1,783	287,570	291,233	4,880	7,308	71.9	475,551	230,981	101	3	10	8.8
		1947 1,782	277,777	281,309	4,846	6,642	70.8	430,772	204,005	87	..	13	13.0
	Gulf, Mobile & Ohio	1948 2,847	340,620	343,803	605	16,074	74.4	1,017,748	495,726	112	17	17	11.6
		1947 2,846	399,085	404,352	358	17,995	73.6	1,155,947	564,651	130	14	2	1.4
	Illinois Central	1948 6,550	1,441,927	1,445,594	49,809	53,117	65.5	3,668,414	1,756,814	561	20	80	12.1
		1947 6,581	1,427,509	1,442,136	51,216	53,564	67.2	3,614,351	1,733,513	565	23	76	11.4
	Louisville & Nashville	1948 4,750	1,421,550	1,538,466	40,909	37,639	63.0	2,758,596	1,437,012	411	19	70	14.0
		1947 4,756	1,523,233	1,650,936	45,882	38,895	64.1	2,849,268	1,498,393	400	2	77	16.1
	Nash., Chatt. & St. Louis	1948 1,051	265,564	273,117	7,388	6,443	77.3	407,492	201,150	84	..	6	6.7
		1947 1,052	282,608	304,626	8,209	6,577	76.9	411,639	199,478	88	...	15	14.6
	Seaboard Air Line	1948 4,142	679,090	705,049	10,338	20,747	68.0	1,388,940	656,542	259	30	46	13.7
		1947 4,145	716,315	772,808	13,299	20,894	70.0	1,357,532	637,712	270	11	60	17.6
	Southern	1948 6,449	1,580,352	1,606,334	30,125	42,371	70.8	2,691,411	1,240,939	582	24	147	19.5
		1947 6,451	1,597,689	1,626,553	29,587	43,856	72.7	2,725,202	1,262,761	542	38	107	15.6
Northwestern Region	Chicago & North Western	1948 8,055	1,073,331	1,131,638	27,609	35,532	65.6	2,448,805	1,101,492	375	..	103	21.5
		1947 8,016	1,138,825	1,187,143	33,505	35,851	68.9	2,498,059	1,129,307	360	...	122	25.3
	Chicago Great Western	1948 1,445	222,209	225,024	10,902	9,529	69.2	616,590	273,200	56	1	11	16.2
		1947 1,445	268,237	271,461	13,868	9,052	69.3	594,588	267,992	67	..	14	17.3
	Chic., Milw., St. P. & Pac.	1948 10,663	1,578,001	1,665,302	76,710	53,575	64.1	3,749,211	1,731,158	478	19	83	14.3
		1947 10,677	1,599,731	1,680,564	75,173	53,467	64.7	3,701,558	1,674,348	486	13	103	17.1
	Chic., St. P., Minn. & Omaha	1948 1,606	229,025	245,364	13,589	6,152	70.9	415,364	195,969	88	1	25	21.9
		1947 1,606	227,279	242,484	13,166	6,172	72.0	409,175	192,176	79	..	35	30.7
	Duluth, Missabe & Iron Range	1948 578	169,810	170,697	1,212	8,860	51.8	846,183	513,907	48	..	1	2.0
		1947 548	171,300	171,918	980	9,144	51.2	839,416	510,036	41	..	1	2.4
	Great Northern	1948 8,237	1,253,032	1,256,768	52,453	50,857	62.9	3,859,990	1,932,426	394	26	53	11.2
		1947 8,237	1,319,701	1,332,477	57,826	50,786	59.6	3,923,275	1,841,132	381	9	75	16.1
	Minneap., St. P. & S. St. M.	1948 4,180	501,071	512,910	8,875	16,952	65.4	1,173,777	564,705	128	...	11	7.9
		1947 4,181	520,294	534,467	11,436	15,098	62.3	1,081,405	511,088	125	...	17	12.0
	Northern Pacific	1948 6,593	988,890	1,047,067	59,422	39,545	65.0	2,805,312	1,311,123	360	7	52	12.4
		1947 6,623	976,583	1,032,425	58,059	37,722	65.2	2,628,153	1,190,548	351	15	59	13.9
Central Western Region	Atch., Top. & S. Fe (incl. G. C. & S. F. & P. & S. F.)	1948 13,080	2,692,196	2,853,648	131,571	104,465	70.0	6,807,687	2,836,537	710	81	149	15.9
		1947 13,107	2,911,478	3,090,999	155,164	112,068	71.0	7,191,224	2,983,784	759	77	119	12.5
	Chic., Burl. & Quincy	1948 8,670	1,355,352	1,392,807	48,996	56,114	65.0	3,826,074	1,732,585	419	26	82	15.6
		1947 8,663	1,553,107	1,606,513	62,169	58,673	62.9	4,101,679	1,832,464	429	..	65	13.2
	Chic., Rock I. & Pac.	1948 7,613	1,126,120	1,165,615	11,827	36,869	68.8	2,410,578	1,115,402	295	32	53	13.9
		1947 7,623	1,166,619	1,195,449	11,787	38,166	68.0	2,513,330	1,152,283	279	29	93	23.2
	Denver & R. G. Wn.	1948 2,443	475,360	535,187	79,725	16,343	74.5	1,064,103	504,649	179	8	34	15.4
		1947 2,467	490,929	552,214	71,256	15,759	75.5	1,022,119	482,528	168	18	46	19.0
	Southern Pacific	1948 8,093	2,186,402	2,443,370	450,934	93,853	69.0	6,228,938	2,626,374	766	2	161	17.3
		1947 8,127	2,252,064	2,539,868	494,853	91,344	68.5	6,030,134	2,497,119	782	15	164	17.1
	Union Pacific	1948 9,751	2,725,692	2,825,218	200,165	114,481	66.3	7,404,781	3,030,786	632	33	123	15.6
		1947 9,774	3,073,448	3,230,721	258,131	118,570	66.9	7,895,364	3,414,131	749	17	79	9.3
	Western Pacific	1948 1,192	256,398	281,718	25,469	11,802	80.5	689,799	324,773	80	28	15	12.2
		1947 1,192	275,592	317,976	34,209	12,711	79.6	770,061	363,680	88	23	22	16.5
Southwestern Region	International-Gt. Northern*	1948 1,110	193,722	195,050	1,422	5,924	67.8	417,642	195,176	68	..	14	17.1
		1947 1,110	237,428	239,616	306	6,481	71.5	416,513	202,646	78	..	12	13.3
	Kansas City Southern	1948 885	186,091	187,063	1,564	9,301	68.0	628,644	297,835	45	5	6	10.7
		1947 885	201,359	206,112	652	9,003	66.8	611,220	288,308	50	2	7	11.9
	Mo.-Kans.-Texas Lines	1948 3,241	610,652	626,628	7,646	18,528	61.7	1,264,174	552,123	125	2	24	15.9
		1947 3,241	516,035	526,880	8,856	15,723	65.4	1,023,069	446,677	120	..	33	21.6
	Missouri Pacific*	1948 6,986	1,436,583	1,479,080	31,226	49,096	66.4	3,330,937	1,507,367	423	2	53	11.1
		1947 6,985	1,531,713	1,604,259	40,009	51,255	69.3	3,401,091	1,576,913	437	..	55	11.2
	Texas & Pacific	1948 1,852	454,447	454,447	14,260	15,599	64.8	1,067,483	461,404	101	5	15	12.4
		1947 1,851	493,547	493,547	16,153	16,282	63.7	1,128,086	487,449	110	4	12	9.5
	St. Louis-San Francisco	1948 4,615	759,411	775,879	8,412	22,631	67.4	1,530,275	693,806	290	19	40	11.5
		1947 4,615	927,406	967,670	10,905	23,605	65.5	1,619,930	721,473	290	12	31	9.3
	St. Louis Southw. Lines	1948 1,562	349,007	349,645	4,747	14,427	74.4	880,126	393,429	81	13	14	13.0
		1947 1,568	353,883	355,541	4,883	13,691	75.3	826,639	369,519	83	8	13	12.5
	Texas & New Orleans	1948 4,314	933,853	933,907	17,859	26,649	70.8	1,753,539	805,259	218	..	35	13.8
		1947 4,314	907,420	907,695	13,168	25,120	71.3	1,611,780	726,511	216	..	34	13.6

Items for the Month of June 1948 Compared with June 1947

	Region, road and year	Freight cars on line: Home	Foreign	Total	Per Cent B.O.	G.t.m.per train-hr. excl.locos. and tenders	G.t.m.per train-mi. excl.locos. and tenders	Net ton-mi. per train-mile	Net ton-mi. per l'd car-mile	Net ton-mi. per car-day	Car miles per car-day	Net daily ton-mi. per road-mi.	Coal lb. per 1000 g.t.m. inc.-loco.	Mi. per loco. per day
New Eng. Region	Boston & Albany 1948	249	5,091	5,340	1.0	26,597	1,730	712	27.3	504	29.8	7,482	154	62.7
	1947	217	4,902	5,119	.4	24,273	1,569	679	28.3	622	33.6	8,897	183	74.4
	Boston & Maine 1948	1,622	9,907	11,529	2.8	34,977	2,251	1,005	27.6	842	42.4	5,650	103	99.2
	1947	1,501	11,602	13,103	2.7	34,104	2,257	1,011	26.8	838	41.9	5,946	106	101.1
	N. Y., N. H. & Htfd 1948	1,426	20,460	21,886	1.5	33,148	2,397	1,089	27.5	527	26.9	6,509	78	94.6
	1947	1,243	19,213	20,456	1.7	31,329	2,295	1,048	27.2	586	29.7	6,499	83	90.1
Great Lakes Region	Delaware & Hudson 1948	2,754	7,028	9,782	4.5	55,643	3,101	1,700	39.5	1,516	55.3	19,674	103	71.6
	1947	1,751	7,804	9,555	3.8	54,997	3,074	1,727	38.6	1,629	56.9	19,847	98	70.0
	Del., Lack. & Western 1948	4,460	11,054	15,514	4.8	42,550	2,943	1,416	31.5	856	37.5	14,055	105	91.5
	1947	4,036	13,433	17,469	4.4	42,341	2,923	1,373	30.8	836	38.2	15,048	106	107.7
	Erie 1948	7,293	25,233	32,526	4.3	56,890	3,550	1,507	27.3	1,031	55.3	15,001	99	77.1
	1947	5,752	27,035	32,787	3.4	53,059	3,213	1,326	27.2	1,091	61.0	15,637	93	89.3
	Grand Trunk Western 1948	4,507	8,727	13,234	8.2	43,061	2,197	1,001	30.2	660	32.6	9,241	57	131.2
	1947	3,947	9,854	13,801	7.1	39,865	2,083	919	28.1	616	32.0	9,095	87	148.6
	Lehigh Valley 1948	6,923	12,475	19,398	13.0	53,889	2,949	1,511	34.2	745	29.8	11,894	95	111.5
	1947	6,319	15,088	21,407	7.8	53,667	3,078	1,535	34.1	748	31.3	12,977	99	86.6
	New York Central 1948	50,583	103,472	154,055	3.5	39,286	2,559	1,224	33.3	816	37.8	1,208	107	94.7
	1947	40,834	104,409	145,243	3.3	39,361	2,524	1,184	31.6	861	41.3	12,114	106	99.3
	New York, Chic. & St. L. 1948	2,214	13,046	15,260	1.9	50,951	2,621	1,196	28.6	1,502	72.7	13,914	83	123.6
	1947	2,042	13,945	15,987	1.6	49,783	2,584	1,134	28.1	1,446	75.0	14,247	86	137.9
	Pitts. & Lake Erie 1948	4,691	10,424	15,115	6.5	56,092	3,759	2,276	49.8	459	13.2	30,510	94	64.4
	1947	3,146	9,147	12,293	7.5	51,502	3,389	2,019	49.4	518	15.5	29,297	100	73.3
	Wabash 1948	5,814	15,405	21,219	3.2	44,650	2,256	999	27.9	1,041	51.6	8,994	104	117.5
	1947	4,893	15,407	20,300	4.5	45,508	2,302	1,030	27.7	1,051	51.5	9,258	102	116.4
Central Eastern Region	Baltimore & Ohio 1948	45,646	46,684	92,330	6.9	34,473	2,739	1,398	37.4	930	37.7	14,181	138	82.2
	1947	38,245	51,802	90,047	4.8	32,314	2,654	1,334	36.3	976	41.1	14,127	144	82.7
	Central of New Jersey* 1948	830	9,118	9,948	5.6	39,688	3,195	1,695	39.4	411	15.6	10,000	88	71.4
	1947	638	9,642	10,280	3.8	37,181	2,927	1,567	37.9	380	14.9	9,658	117	72.1
	Central of Pennsylvania 1948	880	3,807	4,687	9.4	39,070	3,040	1,694	41.0	897	31.1	19,836	135	79.4
	1947	802	4,151	4,953	8.6	37,640	2,921	1,621	38.9	782	28.7	18,613	101	65.8
	Chicago & Eastern Ill. 1948	1,781	4,257	6,038	5.7	37,423	2,361	1,147	32.7	962	42.6	6,402	102	77.8
	1947	1,476	4,592	6,068	4.6	35,205	2,078	1,028	32.3	971	42.3	6,470	113	84.8
	Elgin, Joliet & Eastern 1948	6,460	14,162	20,622	1.4	19,848	2,928	1,624	42.5	261	8.9	20,660	210	98.4
	1947	5,755	8,901	14,656	2.1	18,550	2,504	1,385	42.0	343	11.8	13,073	121	102.8
	Pennsylvania System 1948	113,878	127,763	241,641	9.3	39,889	3,027	1,527	36.0	735	30.9	17,760	108	80.4
	1947	109,192	139,079	248,271	10.3	37,805	2,914	1,486	35.4	738	30.2	18,481	116	82.5
	Reading 1948	12,085	21,233	33,318	7.4	37,187	2,970	1,666	43.7	738	25.0	18,037	95	77.0
	1947	7,477	24,948	32,425	3.5	34,835	2,832	1,577	41.6	708	24.8	16,879	98	73.7
	Western Maryland 1948	4,217	3,250	7,467	1.3	32,262	3,092	1,709	46.0	1,632	57.6	14,003	138	62.0
	1947	2,462	5,826	8,288	.8	30,866	2,968	1,658	46.9	1,438	48.8	14,626	149	66.4
Pocahontas Region	Chesapeake & Ohio 1948	47,951	28,576	76,527	2.1	56,108	3,671	2,095	48.0	1,482	52.5	22,637	75	94.3
	1947	44,318	30,379	74,697	1.6	57,087	3,762	2,109	47.6	1,557	56.8	23,770	76	96.3
	Norfolk & Western 1948	27,527	8,153	35,680	3.0	64,989	4,097	2,267	48.5	1,787	62.8	29,282	86	105.9
	1947	27,157	8,934	36,091	2.3	65,304	4,084	2,260	48.2	1,701	59.6	28,471	88	106.5
Southern Region	Atlantic Coast Line 1948	8,374	17,760	26,134	3.9	27,429	1,681	788	31.3	866	41.4	3,951	123	73.6
	1947	7,895	18,505	26,400	4.8	27,467	1,789	829	30.3	843	41.3	3,883	115	68.3
	Central of Georgia 1948	1,930	6,426	8,356	6.9	29,793	1,658	805	31.6	964	42.4	4,318	124	92.8
	1947	1,556	5,946	7,502	5.0	28,061	1,554	736	30.7	950	43.7	3,816	139	99.3
	Gulf, Mobile & Ohio 1948	2,552	12,053	14,605	1.8	54,609	2,999	1,461	30.8	1,131	49.3	5,804	73	84.9
	1947	2,347	15,890	18,237	1.2	51,453	2,904	1,419	31.4	1,123	48.6	6,613	54	98.8
	Illinois Central 1948	16,266	36,899	53,165	1.7	44,919	2,572	1,232	33.1	1,153	53.3	8,941	106	80.0
	1947	13,568	37,222	50,790	1.7	43,319	2,601	1,247	32.4	1,140	52.4	8,780	113	80.0
	Louisville & Nashville 1948	29,425	16,041	45,466	3.2	30,586	1,945	1,013	38.2	1,087	45.2	10,084	121	111.3
	1947	23,684	16,720	40,404	4.3	28,807	1,871	984	38.5	1,244	50.4	10,502	122	122.6
	Nash., Chatt. & St. Louis 1948	832	5,267	6,099	3.7	29,606	1,545	763	31.2	1,098	45.5	6,380	141	107.6
	1947	1,019	5,493	6,512	7.6	27,699	1,461	708	30.3	1,038	44.5	6,321	133	104.4
	Seaboard Air Line 1948	6,513	15,466	21,979	1.4	35,569	2,090	988	31.6	1,012	47.0	5,284	112	80.7
	1947	5,509	15,733	21,242	1.5	33,031	1,937	909	30.5	1,006	47.1	5,128	117	85.3
	Southern 1948	12,894	30,615	43,509	4.0	29,661	1,721	794	29.3	941	45.4	6,414	122	80.8
	1947	12,101	29,105	41,206	5.1	28,865	1,727	800	28.8	1,023	48.9	6,525	124	85.1
Northwestern Region	Chicago & North Western 1948	19,761	37,740	57,501	2.5	35,105	2,394	1,077	31.0	646	31.8	4,558	110	88.0
	1947	18,120	41,897	60,017	3.1	32,660	2,354	1,064	31.5	619	28.6	4,670	118	92.0
	Chicago Great Western 1948	1,246	5,972	7,218	4.4	46,567	2,779	1,231	28.7	1,330	67.0	6,302	108	122.0
	1947	943	5,352	6,295	3.2	36,260	2,219	1,000	29.6	1,443	70.3	6,182	120	124.8
	Chic., Milw., St. P. & Pac. 1948	22,744	41,611	64,355	2.0	37,056	2,397	1,107	32.3	901	43.5	5,412	111	107.7
	1947	17,967	48,672	66,639	1.6	35,320	2,337	1,057	31.3	862	42.6	5,227	113	105.8
	Chic., St. P., Minn. & Omaha 1948	1,130	9,349	10,479	3.5	24,104	1,919	905	31.9	644	28.5	4,067	105	81.7
	1947	1,019	8,026	9,045	4.6	22,807	1,870	879	31.1	728	32.5	3,989	115	81.0
	Duluth, Missabe & Iron Range 1948	13,934	520	14,454	2.7	84,779	5,240	3,183	58.0	1,156	38.5	29,637	61	131.1
	1947	14,541	541	15,082	1.8	82,660	5,071	3,081	55.8	1,128	39.5	31,024	57	146.0
	Great Northern 1948	21,720	26,624	48,344	2.3	47,051	3,123	1,564	38.0	1,310	54.8	7,820	89	100.5
	1947	18,204	32,588	50,792	2.7	44,079	3,008	1,411	36.3	1,248	57.7	7,451	94	108.7
	Minneap., St. P. & S. St. M. 1948	6,151	12,109	18,260	4.4	39,631	2,381	1,146	33.3	1,009	46.3	4,503	81	139.5
	1947	5,534	11,440	16,974	4.5	34,466	2,109	997	33.9	1,047	49.6	4,075	88	144.3
	Northern Pacific 1948	18,921	21,816	40,737	5.0	44,735	2,852	1,333	33.2	1,072	49.7	6,629	130	96.9
	1947	12,979	22,817	35,796	3.7	43,846	2,711	1,228	31.6	1,119	54.4	5,992	133	93.6
Central Western Region	Atch., Top. & S. Fe (incl. G. C. & S. F. & P. & S. F.) 1948	38,812	34,092	72,904	5.4	49,973	2,539	1,058	27.2	1,267	66.7	7,229	96	111.5
	1947	32,458	38,392	70,850	5.7	48,154	2,482	1,030	26.6	1,358	71.8	7,588	97	119.6
	Chic., Burl. & Quincy 1948	12,656	29,573	42,229	2.7	50,075	2,832	1,282	30.9	1,366	68.0	6,661	95	96.4
	1947	13,248	29,466	42,714	2.6	44,398	2,652	1,185	31.2	1,402	71.3	7,051	99	119.8
	Chic., Rock I. & Pac. 1948	9,212	24,311	33,523	3.5	38,529	2,151	995	30.3	1,077	51.7	4,884	100	108.4
	1947	8,170	26,380	34,550	3.5	37,910	2,162	991	30.2	1,137	55.3	5,039	97	105.1
	Denver & R. G. Wn. 1948	6,981	10,501	17,482	3.7	36,457	2,256	1,070	30.9	930	40.4	6,886	168	99.2
	1947	6,339	8,794	15,133	4.1	34,503	2,098	990	30.6	1,033	44.7	6,520	168	91.2
	Southern Pacific 1948	25,680	40,911	66,591	3.3	44,446	2,883	1,216	28.0	1,267	65.6	10,817	91	110.9
	1947	22,009	42,510	64,519	2.9	40,933	2,708	1,121	27.3	1,308	69.8	10,242	101	111.6
	Union Pacific 1948	24,935	38,732	63,667	3.2	59,697	2,770	1,134	26.5	1,529	87.1	10,361	111	135.3
	1947	21,682	39,483	61,165	2.3	52,032	2,618	1,132	28.8	1,786	92.7	11,644	123	142.7
	Western Pacific 1948	2,216	3,116	5,332	8.4	53,151	2,697	1,270	27.5	2,024	91.4	9,082	57	85.1
	1947	2,068	3,406	5,474	3.4	54,762	2,805	1,325	28.6	2,189	96.2	10,170	65	88.7
Southwestern Region	International-Gt. Northern* 1948	423	6,607	7,030	1.0	38,218	2,179	1,018	32.9	899	40.3	5,861	88	87.0
	1947	364	6,637	7,001	1.3	32,949	1,777	865	31.3	963	43.0	6,085	100	103.2
	Kansas City Southern 1948	1,174	6,041	7,215	3.9	64,622	3,393	1,607	32.0	1,289	59.2	11,218	100	119.4
	1947	956	5,801	6,757	4.7	58,964	3,052	1,440	32.0	1,381	64.6	10,859	101	118.2
	Mo.-Kans.-Texas Lines 1948	2,125	10,231	12,356	.6	37,381	2,085	911	29.8	1,445	78.6	5,679	84	147.4
	1947	1,252	8,692	9,944	1.0	37,216	1,991	869	28.4	1,430	76.9	4,594	85	121.8
	Missouri Pacific* 1948	13,243	24,722	37,965	2.1	44,768	2,335	1,057	30.7	1,300	63.8	7,192	94	111.3
	1947	14,568	22,652	37,220	2.0	39,973	2,236	1,037	30.8	1,363	63.9	7,525	105	118.8
	Texas & Pacific 1948	1,592	7,986	9,578	2.9	45,878	2,362	1,021	29.6	1,622	84.7	8,305	81	138.5
	1947	844	9,502	10,346	2.3	41,755	2,326	1,005	29.9	1,568	82.2	8,778	88	138.3
	St. Louis-San Francisco 1948	5,539	14,469	20,008	2.2	39,251	2,024	918	30.7	1,150	55.7	5,011	114	80.6
	1947	3,968	16,787	20,755	2.2	33,959	1,752	780	30.6	1,184	59.1	5,211	120	102.9
	St. Louis Southw. Lines 1948	1,617	6,405	8,022	1.1	46,357	2,525	1,129	27.3	1,746	86.0	8,396	74	119.6
	1947	1,026	5,745	6,771	1.2	44,236	2,339	1,046	27.0	1,806	88.9	7,855	76	123.3
	Texas & New Orleans 1948	3,339	18,380	21,719	2.8	36,564	1,895	870	30.2	1,259	58.9	6,222	84	133.0
	1947	2,783	15,412	18,195	3.1	35,046	1,794	809	28.9	1,292	62.6	5,614	85	128.6

*Report of trustee or trustees.
Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission. Subject to revision.

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Current Publications

BOOKS

Railroad Conductor, by Fred A. Winkler. 201 pages. Published by the Pacific Book Company, 326 W. First ave., Spokane 8, Wash. Price, $2.75.

A study of the railroad conductor from the time of the first conductor (1831) to the period following World War II. Divided into five parts, the book covers the historical development of the railroad conductor, the conductor at work, the conductor at home, his participation in the community, and social attitudes towards railroad conductors. Under Part Two, the conductor at work, there are chapters on the development of relationships between carrier and conductor, attitudes of conductors toward present working conditions, economic status of the railroad conductor and the conductor and his fellow workers. Part Three, the conductor at home, covers his social characteristics, material possessions, interests and recreation, and family relationships. Part Four, participation in the community, covers participation in organized groups and the conductor and his friends. Part Five, social attitudes towards railroad conductors, covers what the public thinks about passenger conductors and attitudes favorable and unfavorable to them as a group.

Pioneer Railroad; The Story of the Chicago & North Western System, by Robert J. Casey and W. A. S. Douglas. 334 pages, illustrations. Published by Whittlesey House, 330 West 42nd st., New York 18, N. Y. Price, $4.

The story of the Chicago & North Western from the days of the little "Pioneer" locomotive to the present Diesel-powered streamliners. Founded as the Galena & Chicago Union by William Butler Ogden, who saw the need of a railroad that would link Chicago with the rich agricultural lands of the Rock River valley, the railroad grew and began to push out into the forests of Wisconsin and Minnesota, the farming country of Iowa and the plains of Nebraska and the Dakotas. Among others who have been responsible for its development are Marvin Hughitt, who guided its construction and expansion program, and R. L. Williams, the present president, who was responsible for taking the company through reorganization and improvement of its present-day facilities and services. The account of its growth, the part these men played in it, the acquisition of the Chicago, St. Paul, Minneapolis & Omaha, and many other facts of interest make up this history of the "Pioneer Railroad." An appendix contains the names of all the road's president's and directors, the history of each of its Chicago passenger stations, the names of all its stations and a chronology of the construction of lines now parts of the C.&N.W.

PAMPHLETS

The Netherlands Railways in 1947, by Thomas W. McElhiney and Fenny Numann. Three pages. Issued by the Office of International Trade, United States Department of Commerce. Available from the Government Printing Office, Washington 25, D. C. Price, five cents.

The recently-published annual report of the state-controlled Netherlands Railways for 1947 reveals a great need for new rolling stock; expresses anxiety over the growing competition of truck and automobile transportation; presents figures on passenger transportation, freight traffic, and financial results of the year's operation; and outlines plans for improvement and acquisition of rolling stock. This pamphlet is a translated digest of the report.

Railroads in 1947; The Story of Their Finances. Eight pages. Published by the Federation for Railway Progress, P.O. Box 6539, Terminal Tower, Cleveland 1, Ohio. Free

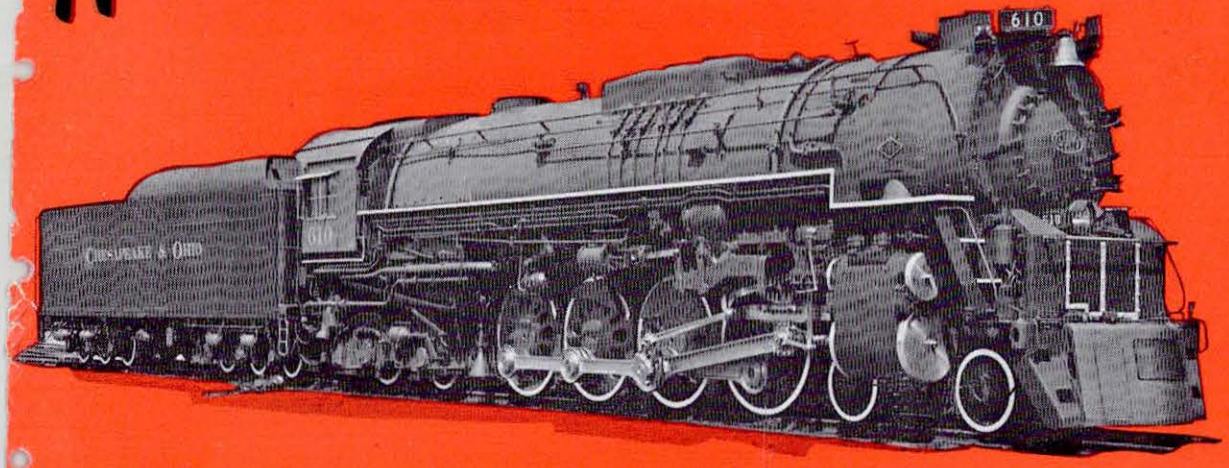
The financial situation of the railroads in 1947 is presented simply and clearly in this little folder. Leading off with the balance sheet, there is a list of what the railroads own, and where the money for it came from. This indicates that it cost $22 billion to build the machine which produces our railroad transportation service. It would cost $35 billion to replace it, but at the end of 1947 its market price was only $11 billion. In other words, the American people, exercising their free judgment, were willing to pay only fifty cents for property which the owners state cost $1 and which would cost $1.59 to replace. Looking for an answer to why this is so, there follow brief summaries of income and expenses and the disposition of the resulting net income. This shows that investors as a group earned about 3½ cents per dollar of investment shown on the books. The common stockholder earned about 3¾ cents per dollar investment, but he got only 1.6 cents of that as dividends while the rest, 2.1 cents, went back into the business. The pamphlet concludes with a brief list of things the railroads should do to remedy this situation.

ARTICLES IN PERIODICALS

Giant of the North, by Temple Fielding. Saturday Evening Post, August 28, September 4, September 11, 1948. Published by Curtis Publishing Company, Independence Square, Philadelphia 5, Pa. Single copies, 15 cents.

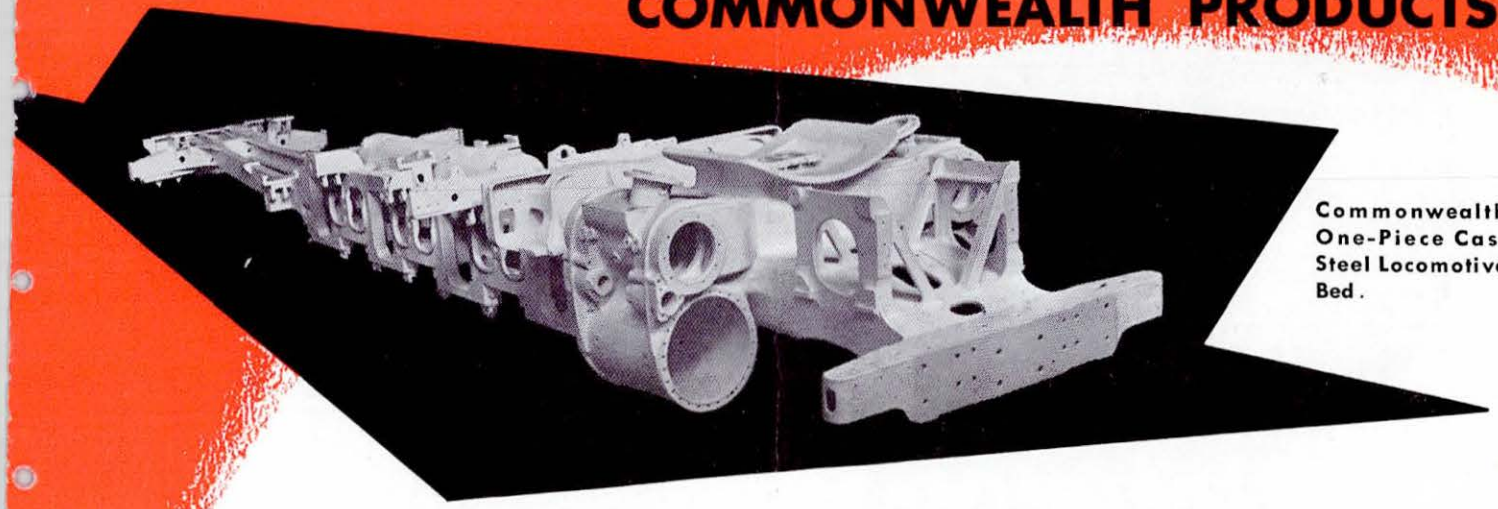
The epic of a business empire that unified a dominion. The colossus that is the Canadian Pacific includes everything from schools and Turkish baths to steamships, slaughter houses and a wishing well. Part I is the story of the building of the railroad; Part II is devoted primarily to William M. Neal, its recently-retired president; and Part III describes the non-railroad activities carried on by the C.P.R.

New POWER for the C & O!



4-8-4 Type Passenger Locomotive built by Lima-Hamilton Corporation for C & O Railway. 80,700 lbs. tractive power (with booster).

Equipped for Peak Performance with COMMONWEALTH PRODUCTS



Commonwealth One-Piece Cast Steel Locomotive Bed.

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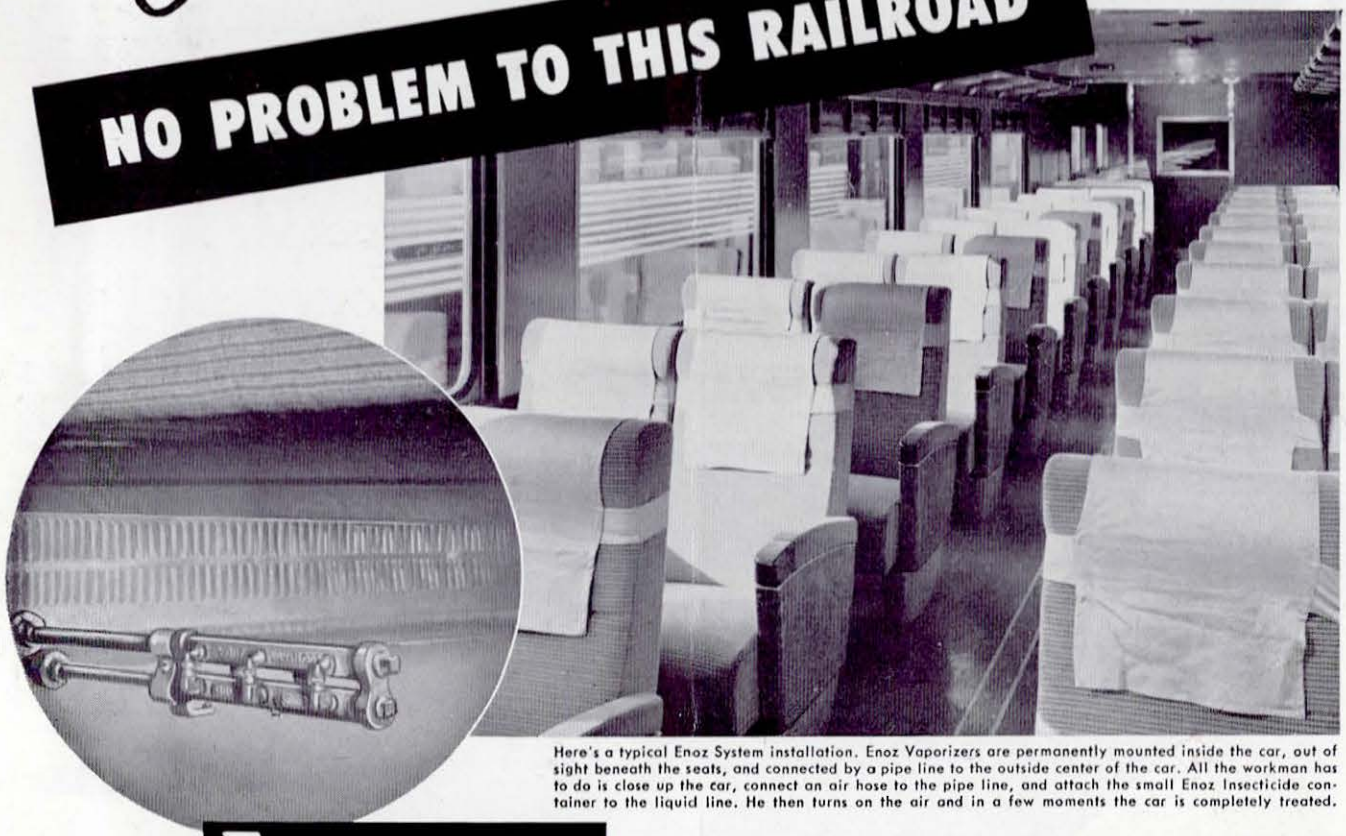

Here's a typical Enoz System installation. Enoz Vaporizers are permanently mounted inside the car, out of sight beneath the seats, and connected by a pipe line to the outside center of the car. All the workman has to do is close up the car, connect an air hose to the pipe line, and attach the small Enoz Insecticide container to the liquid line. He then turns on the air and in a few moments the car is completely treated.

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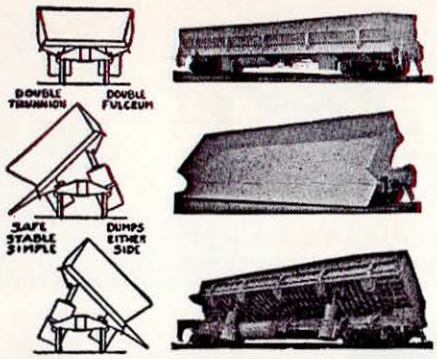

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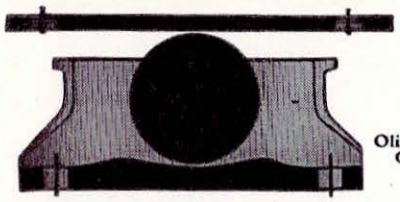

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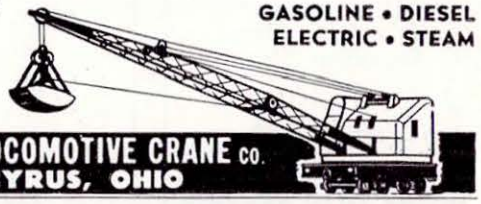

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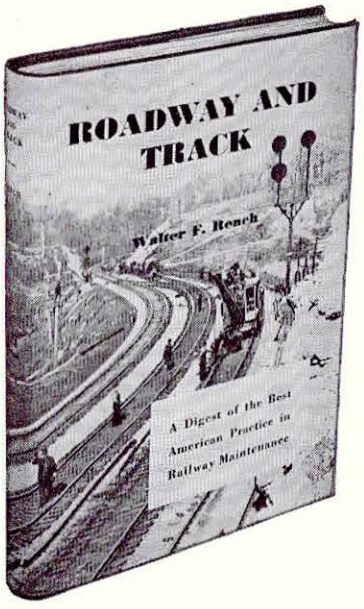

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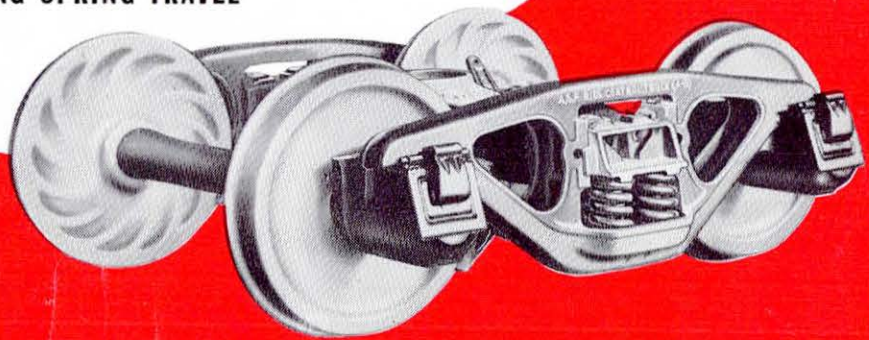

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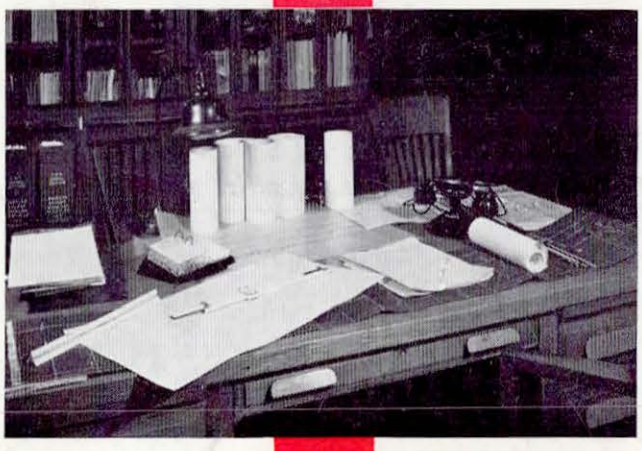

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